Appendix 7: Project and process description, monitoring, metering

01-FLOW DIAGRAM HW DISSOLVING SYSTEM JUPITER

02-PROCESS DESCRIPTION BALE PULPING SYSTEM JUPITER DEP B

03-PROCESS DESCRIPTION BALE PULPING SYSTEM NEPTUNE DEP B

04-DESCRIPTION BALE HANDLING NEPTUNE HW LINE

05-DESCRIPTION BALE HANDLING JUPITER HW LINE

06-DESCRIPTION BALE HANDLING NEPTUNE SW LINE

07-DESCRIPTION BALE HANDLING JUPITER SW LINE

08-BALE PULPERS TRANSFORMER ROOM EXHAUST

09-BALE PULPERS EXHAUST

10-BALE PULPERS MCC & MV ROOM VENTILATION

11-FLOW DIAGRAM NEPTUNE SOFT AND HARDWOOD LINE

12-FLOW DIAGRAM NEPTUNE MIXING SYSTEM

13-FLOW DIAGRAM NEPTUNE APPROACH SYSTEM

14-FLOW DIAGRAM NEPTUNE MACHINE BROKE PULPER SYSTEM

15-FLOW DIAGRAM NEPTUNE INTERNAL BROKE SYSTEM

16-FLOW DIAGRAM NEPTUNE WHITE WATER SYSTEM 1

17-FLOW DIAGRAM NEPTUNE WHITE WATER SYSTEM 2

18-FLOW DIAGRAM NEPTUNE SHOWER WATER SYSTEM

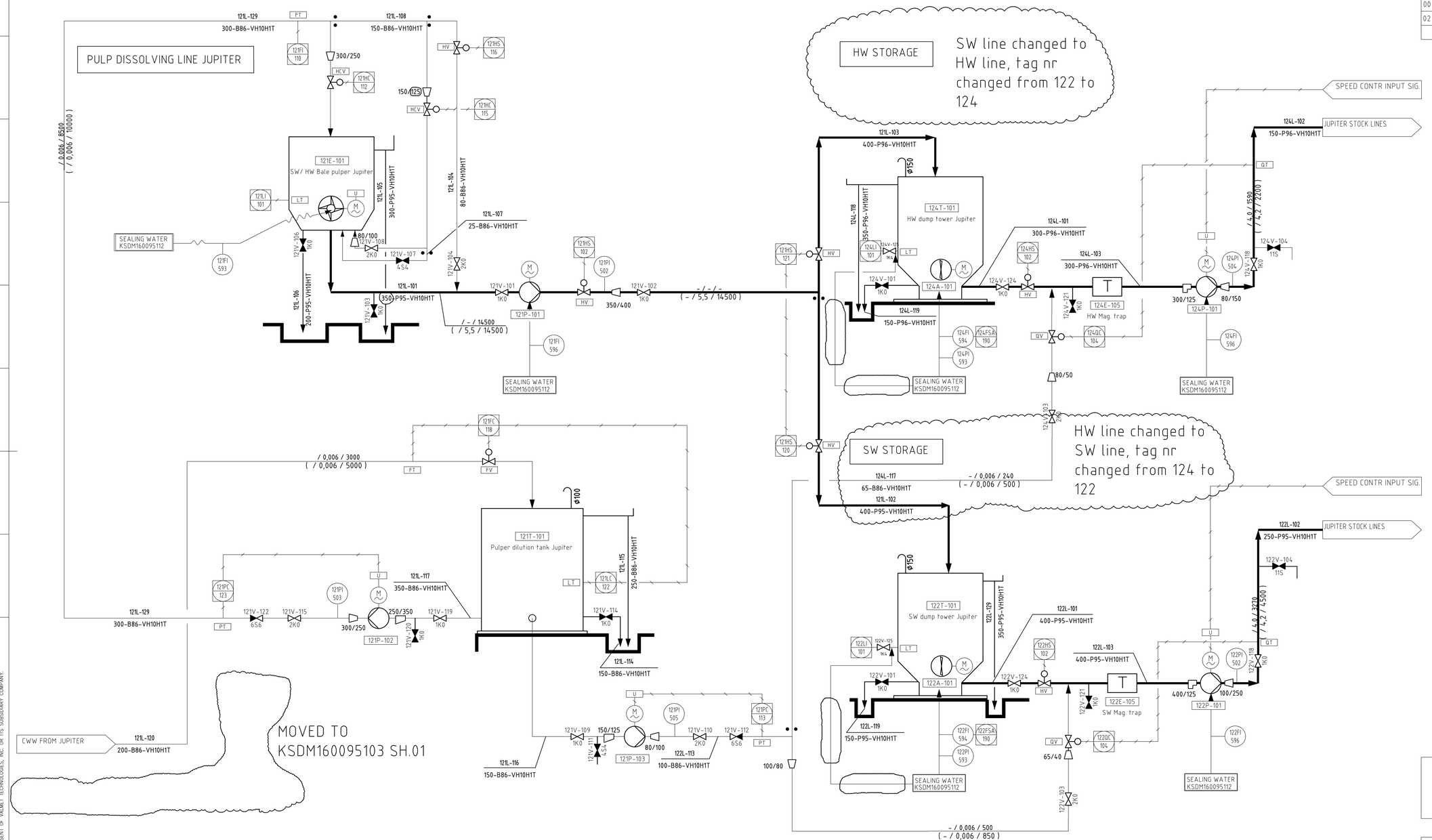
19-FLOW DIAGRAM NEPTUNE FRESH WATER SYSTEM

20-FLOW DIAGRAM NEPTUNE VACUUM SYSTEM

21-FLOW DIAGRAM NEPTUNE MILL AIR SYSTEM

22-FLOW DIAGRAM PROCESS VENTILATION

23-FLOW DIAGRAM NEPTUNE SEALING WATER SYSTEM



Rev.No	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
0.1	Certified	02/20/2020	NOM	NNJ	NOM
0.0	Preliminary	12/13/2019	NOM	NNJ	NOM
0.2	Certified, renaming of SW and HW lines	10/07/2020	NOM	NOM	NOM

MATERIAL CODE	
CODE	NAME
VH10H1T	PN10 AISI 304L
VH10H1A	PN10 AISI 304L
VH25H1A	PN25 AISI 304L
VH40H1A	PN40 AISI 304L

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W10	WATER, MECHANICALLY TREATED
G70	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D10	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, ~0,5 MPa
S02	STEAM, LIVE, 0,5-1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MOFIFIER
A108	ADHESIVE
A109	RELEASE
A110	BIOXE

Pipe number
Dim. - Media code - Pipe specification

DESIGN FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)
20 / 4 / 505
(24 / 4 / 600)

TM CB PRODUCTION 15% OF 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
CONVERTING BROKE LINE 70 BDT/D
CB TO JUPITER 36 BDT/D
CB TO N 36 BDT/D

SOFTWOOD LINE 238 BDT/D
HARDWOOD LINE 119 BDT/D
-
-

Valmet
Certified
Signature _____
Date _____

ITEM NUMBER	121E-101	121P-101	121T-101	121P-102	121P-103	122T-101	122A-101	124P-101	122E-105	124T-101	124A-101	122P-101	124E-105
TECHNICAL DATA l/min, bar %-weight	VMi-4340 l/min 7 %	ACP350-480.3F 15000 l/min 5,5 % 17 m wc	% 60 m³	ACP250-315.6S 10000 l/min 0,006 % 18 m wc	ACP80-250.6S 1400 l/min 0,006 % 25 m wc	5,5 % 150 m³	SLF-80.15D - l/min 5,5 %	ACP65-315.4S 2200 l/min 4,2 % 57 m wc	% m³	5,5 % 150 m³	SLF-80.15D - l/min 5,5 %	ACP125-315.4F 4500 l/min 4,2 % 38 m wc	l/min %
DUTY, kW	Inst: 315 kW, 1000 rpm	Inst: kW, 1000 rpm		Inst: 55 kW, 1500 rpm	Inst: 11 kW, 1500 rpm		RDC: 15 kW, 1500 rpm	Inst: 37 kW, 1500 rpm			RDC: 15 kW, 1500 rpm	Inst: 45 kW, 1500 rpm	RDC: kW, rpm

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE	SYSTEM: AutoCAD
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.		
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: EN / SV	SCALE	DRAWN: IDP	DATE: 03/20/2019
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: NNJ	DATE: 02/20/2020
TITLE: NEPTUNE			APPROVED: NOM	DATE: 02/20/2020
SW - HW DISSOLVING SYSTEM JUPITER FROM NEPTUNE			DOCUMENT ID: KSDM160096102JUP	SHEET: 2 / 2
REASON FOR ISSUE: CERTIFIED				REVISION: 02

A1+210

KSDM160095160.00
Jupiter Department B
PRELIMINARY
September 16, 2020

NOM/Mill

1.6 BALE PULPING SYSTEM JUPITER DEP B

					APPROVALS		
Issue	**Date**	**Pages**	**Issue Description**		**By**	**Check**	**Approve**
00	20-09-16		Preliminary		NOM	FKC	
■	Entire Specification Issued this Revision		SPECIFICATION ISSUED FOR:				
			■	Review	☐	Purchase	
☐	Revised Pages Only Issued this Revision		☐	Client Approval	☐	Construction	
			☐	Enquiry	☐		

1.6 PROCESS DESCRIPTION – SW / HW PULPING SYSTEM 3
1.6.1 Concept 3
1.6.2 Functions and interlocks for the Bale pulper system 7
1.6.2.1 Definition of Terms 7
1.6.3.1 Bale pulper Rotor 121E-101-M1 9
1.6.3.2 Bale pulper Dump Pump 121P-101-M1 10
1.6.3.3 Bale pulper Level 121LI-101 11
1.6.3.4 Bale pulper Outlet Valve 121HV-102 12
1.6.3.5 Bale pulper Dilution water 121FI-110 13
1.6.3.6 Dilution water to Bale pulper Valve 121HC-112 14
1.6.3.7 Bale pulper Bottom Dilution Valve 121HC-115 15
1.6.3.8 Bale pulper Dump Pump Dilution Valve 121HV-116 16
1.6.3.9 Bale pulper to SW Dump Tower Valve 121HV-120 17
1.6.3.10 Bale pulper to HW Dump Tower Valve 121HV-121 18
1.6.4 Bale Pulping Sequence Pulper 19

1.6 PROCESS DESCRIPTION – SW / HW PULPING SYSTEM

1.6.1 Concept

The Bale Pulping System consists of one batch pulper, 121E-101 which can feed the soft wood and hardwood lines, via the SW dump tower 122T-101 and HW dump tower 124T-101.

Pulping system Jupiter

The stock is pumped from the bale pulper by the pulper dump pump 121P-101 to the selected dump tower via valves 121HV-120 or 121HV-121 (SW line or HW line) in the pulper pump discharge piping. The bale pulper has an operating volume of approximately 40 m^3 during pulping. Fill and dilution water to the pulper is supplied by the bale pulper dilution water pump 121P-102 and is fed through the top and bottom of the pulper vat. The system will normally operate in an automatic sequence, 121-DS1, as given below in 1.6.4.

Before starting or during the sequence, the operator must select if the sequence should be in AUTO or MANUAL mode. If in Auto Mode, the sequence will start over at step 1 automatically when finished. If in MANUAL mode, the sequence will stop when finished.

If the bale handling is ready to deliver bales, water valves 121HCV-112, 121HCV-115, 121HV-116 and the bale pulper dumping valve 121HV-112 are closed, the level in the bale pulper 121LI-101 is empty the pulper dilution tank level is OK, the water filling of the pulper can start.

The bale pulper inlet valve 121HCV-112 will open and water from the pulper dilution tank 121T-101 will start to fill the bale pulper to a pre-set level. To get the right amount of water into the pulper this valve must start to close before the right amount has been

filled in the pulper, to prevent overfilling. The time difference for when the valve needs to start closing (OF) will be set during commissioning. A flow indicator 121FI-110 will measure the amount of water that has been added to the pulper.

The total fill water required to start feeding bales (pre-set pulper level), the total feed water required to start the pulping sequence and the total feed water required to start discharge of the pulper will be calculated based on below parameters to provide sufficient water to give a pulping consistency of approximately 7% and a dump consistency of approximately 5%.

The operator will provide values to the following parameters for the water calculation:

Bale dryness, P (%)	Default 90% (80-100%)
Bale weight, M (kg)	From weight cells
Consistency pulping, C_1 (%)	Default 7.0% (6.0-8.5%)
Consistency dumping, C_2 (%)	Default 5.0% (4.5-5.5%)
White water for first filling, Q1 (% level)	Bale pulper level
White water for pulping, $Calc_2$ (liters)	(only calculation)
White water for dump, $Calc_3$ (liters)	(only calculation)
Total white-water volume, $Calc_4$ (liters)	(only calculation)
Parameter for over filling, OF (liters)	Default value
Parameter for rotor flushing, FL (liters)	Default value

The level for feeding bales (Q1), pulping water ($Calc_2$) and dump water ($Calc_3$) required are calculated from the following equations (taking the water consistency C_{water} = 0.0%):

WW to start feeding bales into the pulper Q1
Minimum filling level to start feeding the bales, default value 40% (to be adjusted at start-up)

WW for pulping, 7% consistency:

Q2 =((M*(P/100))/(C1/100))-M

Calc $_2$ = Q2 -OF

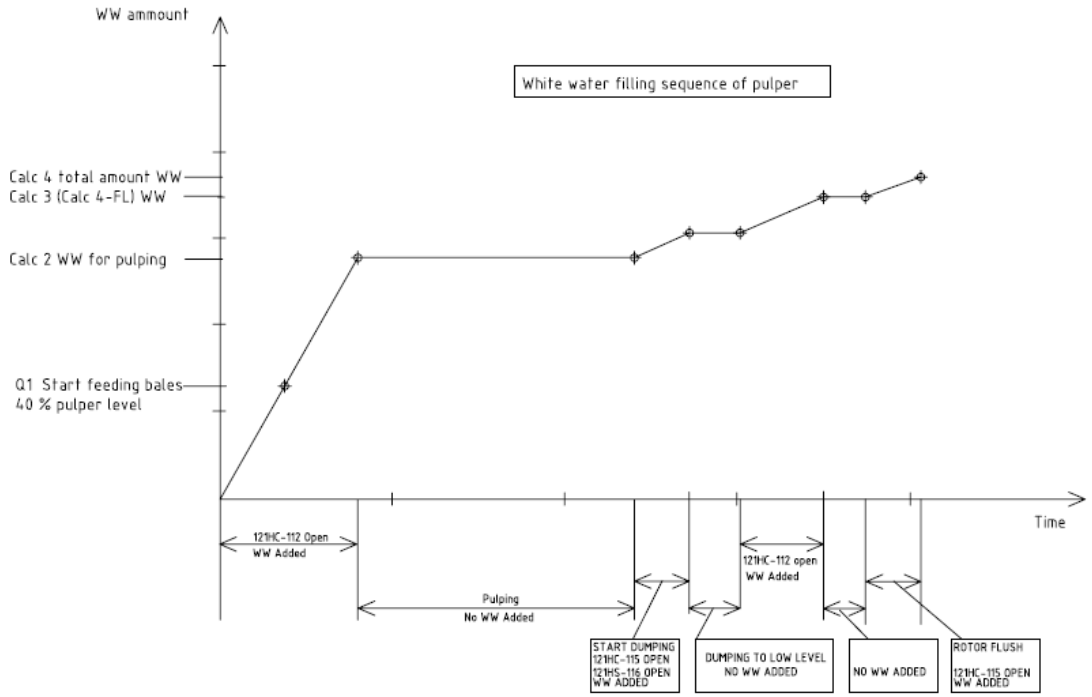
WW for dumping, 5 % consistency:

Q3=((M*(P/100))/(C2/100))-M

Calc$_3$ = Q3-OF-FL

Calc$_4$ =Q3

The total amount of water needed for a whole batch is determined by calc$_4$, the amount of water calculated in calc $_2$ and calc$_3$ are steps to reach calc$_4$ so they should not be added to each other.



White water inlet valve 121HC-112 opens and when the pulper level reaches the pre-set

level (Q1), the pulper rotor will start and the required furnish will be fed into the pulper by the pulper feed conveyor. When reaching the calculated volume $Calc_2$, bale pulper inlet valve 121HCV-112 closes. The pulping period will then commence and last for a pre-set period of approximately 10 minutes. The pulping times can be set by the operator.

In the end of the pulping period the status of the selected dump tower will be checked and, provided there is enough free volume to accept a batch, the dump cycle will start. If the dump tower level 122LI-101 or 124LI-101, for SW line or HW line dump tower respectively, are too high the rotor will ramp down to slow speed until the level is OK for dumping. When the level is OK for dumping, the rotor speed will ramp up before the dumping sequence continues.

Bale pulper bottom dilution valve 121HCV-115 will open and bale pulper dump pump dilution valve 121HV-116 will open for a pre-set time at the start of the dumping, this to ensure that the pulp will be pumped out of the pulper. Bale pulper dump pump 121P-101 will start and bale pulper outlet valve 121HV-102 will open.

When the pulper reaches Low level 121LI-101, Bale pulper inlet valve 121HCV-112 will open and bale pulper bottom dilution valve 121HCV-115 will close. Dilution water is filled into the pulper until the calculated volume $Calc_3$ is reached.

When the pulper reaches the level Low-Low, bale pulper rotor 121E-101-M1 will slow down. When the pulper level reaches Low-low-low, bale pulper bottom dilution valve 121HCV-115 opens to flush the rotor until the calculated volume $Calc_4$ is reached. Then the bale pulper rotor will stop, bale pulper dump pump 121P-101-M1 will stop after a delay and bale pulper outlet valve 121HV-102 will close. The bale pulper pulping sequence is then completed and automatically resets to be ready for the next batch.

1.6.2 Functions and interlocks for the Bale pulper system

1.6.2.1 Definition of Terms

Loop and Valve Number

Loop identification number.

Process Function

A brief description of the loop operation

Point of Control

Whether DCS or local control.

Graphic Display

Title of graphic display

Permissives

A signal required that allows the equipment to be started. Once the equipment is in operation it will continue to operate even if the permissive signal is lost. This signal is required in all control modes unless stated otherwise.

Interlocks

A signal required to start and to continue to operate equipment. Without the interlock signal the equipment will not operate. The equipment will stop operating if it is operating when the signal is lost. This signal is required in all control modes unless stated otherwise.

Manual Mode

Description of manual operation requirements. The equipment must be selected in MANUAL for this operation.

Auto Mode

Description of automatic operation requirements. The equipment must be selected in AUTOMATIC for this operation.

Remote Function

Description of cascade operation requirements or when controlled by a remotely calculated set point. The equipment must be selected in REMOTE for this operation.

Indication

Definition of device status indications and location of indications.

Interlock limits

Definition of interlock requirements.

Alarms

Definition of alarm requirements.

1.6.3.1 Bale pulper Rotor 121E-101-M1

Motor Number

121E-101-M1

Process Function

The rotor breaks up and slushes the baled pulp in the pulper. The motor is speed controlled.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The rotor will stop/will not start if:

- The sealing water pressure, 180PC-117, is Low.

Manual Mode

The rotor is started and stopped by the operator via the DCS

Auto Mode

The Bale pulper rotor is controlled by the Pulping sequence 1.6.4.

Indication

Standard motor display

Motor current display

Motor speed control display

1.6.3.2 Bale pulper Dump Pump 121P-101-M1

Motor Number

121P-101-M1

Process Function

The pump directs stock from Bale pulper, 121E-101, to the SW line or the HW line Dump Towers, 122T-101 or 124T-101.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The pump will stop/will not start if:

- Bale pulper Level 121LI-101 is at empty level to be set during commissioning time delay.
- Bale pulper outlet valve 121HS-102 have not reached open limit 121GS2-102 in 10 s after that pump have started.
- The sealing water pressure, 180PC-117, is Low.
- High level for SW and HW dump towers
- 121HV-120 SW dump tower valve, if closed and SW is selected
- 121HV-121 HW dump tower valve, if closed and HW is selected

Manual Mode

The pump is started and stopped by the operator via the DCS

Auto Mode

The pump is controlled by the Pulping sequence 1.6.4.

Indication

Standard motor display

1.6.3.3 Bale pulper Level 121LI-101

Loop Number

121LI-101

Process Function

The loop indicates the level in Bale pulper, 121E-101.

Point of Indication

At DCS only, no local indication

Graphic Display

Pulping system graphic

Indication

Standard analogue display

121LT-101 – Pulper level transmitter, AI

Interlocking limits

Pulper Empty, Low-Low-Low, Low-Low, Low, OK for dumping, High, High-High

Alarm Limits

High, High-High

1.6.3.4 Bale pulper Outlet Valve 121HV-102

Loop and Valve Number

121HS-102 / 121HV-102

Process Function

The valve feeds the pulp from bale pulper dump pump to SW Dump tower 122T-101 or HW Dump tower 124T-101.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

None

Manual Mode

The valve is opened and closed by the operator via the DCS

Auto Mode

The valve will be forced to Auto Mode and open when Bale pulper Dump Pump 121P-101-M1 starts and will close when Bale pulper Dump Pump stops. The valve operation will be controlled as part of the Pulping sequence 1.6.4.

Indication

Standard digital valve display, two limit switches

121GS1-102 – Closed position, DI

1.6.3.5 Bale pulper Dilution water 121FI-110

Loop Number

121FI-110

Process Function

The loop indicates the flow and total cumulative volume of dilution water added to the pulper as part of the Pulping sequence 1.6.4.

Point of Indication

At DCS only, no local indication

Graphic Display

Pulping system graphic

Indication

Standard analogue display

121FT-110 – Dilution water flow transmitter, AI

Alarm Limits

High-High

1.6.3.6 Dilution water to Bale pulper Valve 121HC-112

Loop and Valve Number

121HC-112 / 121HCV-112

Process Function

The valve controls the addition of fill and dilution water supplied in the top of Bale pulper, 121E-101.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The flow control loop output signal will go to 0% in forced control if:

- Bale pulper Level 121LI-101 is High-High.

Manual Mode

The analogue output from the control loop is increased and decreased by the operator at the DCS and opens / closes the valve.

Auto Mode

The valve operation will be controlled as part of the Pulping sequence 1.6.4.

Indication

Standard PID loop display, output range 0-100%.

121HCV-112– Dilution water to Bale pulper control valve, AO

1.6.3.7 Bale pulper Bottom Dilution Valve 121HC-115

Loop and Valve Number

121HC-115 / 121HCV-115

Process Function

The valve controls the addition of water to the Bale pulper 121E-101 rotor screen plate.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The flow control loop output signal will go to 0% in forced control if:

- Bale pulper Level 121LI-101 is High-High.

Manual Mode

The analogue output from the control loop is increased and decreased by the operator at the DCS and opens / closes the valve.

Auto Mode

The valve operation will be controlled as part of the Pulping sequence 1.6.4.

Indication

Standard PID loop display, output range 0-100%.

121HCV-115 – Flow control valve, AO

1.6.3.8 Bale pulper Dump Pump Dilution Valve 121HV-116

Loop and Valve Number

121HS-116 / 121HV-116

Process Function

The valve controls the addition of dilution water to the suction line of Bale pulper Pump 121P-1101.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The valve will not open if:

- Bale pulper Level 121LI-101 is High-High

Manual Mode

The analogue output from the control loop is increased and decreased by the operator at the DCS and opens / closes the valve.

Auto Mode

The valve operation will be controlled as part of the Pulping sequence 1.5.4.

Indication

Standard digital valve display, two limit switches

121GS1-116 – Closed position, DI

1.6.3.9 Bale pulper to SW Dump Tower Valve 121HV-120

Loop and Valve Number

121HS-120 /121HV-120

Process Function

The loop controls the discharge of stock from Bale pulper 121E-101 to SW Dump Tower 122T-101.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The valve will not open if:

- Bale pulper to SW dump valve is selected open.

Manual Mode

No manual mode.

Auto Mode

The valve will open when SW Dump Tower is selected by the operator. The valve will close when HW Dump Tower is selected. The valve operation will be controlled as part of the Pulping sequence 1.6.4.

Indication

Standard digital valve display, two limit switches

121GS1-120 – Closed position, DI

1.6.3.10 Bale pulper to HW Dump Tower Valve 121HV-121

Loop and Valve Number

121HS-121 / 121HV-121

Process Function

The loop controls the discharge of stock from Bale pulper 121E-101 to HW Dump Tower 124T-101.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The valve will not open if:

- Bale pulper to HW dump valve is selected open.

Manual Mode

No manual mode.

Auto Mode

The valve will open when HW Dump Tower is selected by the operator. The valve will close when SW Dump Tower is selected. The valve operation will be controlled as part of the Pulping sequence 1.6.4.

Indication

Standard digital valve display, two limit switches

121GS1-121 – Closed position, DI

1.6.4 Bale Pulping Sequence Pulper

Note that all interlocks are valid all times and will override any sequence logic where applicable.

Note that the sequence logic is valid only whilst the sequence is active but will override any other logic (with exception of interlocks) during that time where applicable.

Ensure all manual valves are set properly.

Ensure all manually operated on/off valves are set properly.

Ensure seal water is being fed to all relevant equipment.

Ensure all set point values are set properly.

The operator will be given the possibility to change the following parameters:

- Pulping time SW or HW, 10 min (range 7-12 min)
- Select line: No1 or No2 Dump Tower

Sequence Permissive

Prior to a sequence the operator should ensure, either by pressing the dissolving sequence All-Auto button on the screen or by going through each drive/loop manually, check following:

- 121HV-102 Bale pulper Outlet Valve in auto
- 121FI-110 Bale pulper Dilution water in auto
- 121HCV-112 Bale pulper Inlet Valve in auto
- 121HCV-115 Bale pulper Bottom Dilution Valve in auto
- 121HV-116 Bale pulper Dump Pump Dilution Valve in auto
- 121HV-120 Bale pulper to SW Dump Tower Valve in auto
- 121HV-121 Bale pulper to HW Dump Tower valve in auto

- 121P-101-M1 Bale pulper Dump Pump in auto
- 121E-101-M1 Bale pulper Rotor in auto
- Enough level in pulper dilution tank 121LC-122 (min 30%)
- 121P-102 Pulper dilution pump in auto
- Bale pulper feed conveyor in auto, 120HS-107
- Bales at top of feed conveyor, 121GS2-107
- Emergency stop is OK

Sequence start

Before starting or during the sequence, the operator must select if the sequence should be in AUTO or MANUAL mode. If in Auto Mode, the sequence will start over at step 1 automatically when finished. If in MANUAL mode, the sequence will stop when finished. If the sequence is placed into Manual at any time during the Pulping sequence, the sequence will stop after the last step is completed.

Step 1. START DISSOLVING SEQUENCE

Before starting the sequence, the following conditions need to be met if SW batch is selected:

- Bale pulper feed conveyor in auto, 120HS-007
- Bales at top of feed conveyor, 121GS2-007
- Storage conveyor in auto, 120HS-003
- Bale at end f storage conveyor, 120GS2-003
- Emergency stop is OK
- Pulping sequence is not ongoing.

Before starting the sequence, the following conditions need to be met if HW batch is selected:

- Bale pulper feed conveyor in auto, 120HS-107

- Bales at top of feed conveyor, 121GS2-107
- Storage conveyor in auto. 120HS-103
- Bale at end of storage conveyor, 120GS2-103
- Emergency stop is OK
- Pulping sequence is not ongoing.

Before going to next step, the sequence checks following conditions are met:

- 121HCV-112 Bale pulper Inlet Valve – Closed
- 121HCV-115 Bale pulper Bottom Dilution Valve – Closed
- 121HV-116 Bale pulper Dump Pump Dilution Valve – Closed
- 121HV-102 Bale pulper Outlet Valve – Closed
- 121LI-101 Bale pulper Level – Empty
- 121P-102 Bale pulper Dilution Pump – RUN
- Enough level in pulper dilution tank 121LC-122 (min 30%)

Step 2. WATER BATCH 1ST FILLING

- Resets Bale pulper Inlet Flow Totalizer 121FI-110
- Open Bale pulper Inlet Valve 121HCV-112

Before going to next step, the sequence checks following conditions are met:

- 121LI-101 Bale pulper Level Q1 reached – OK for feeding bales
  Q1=40% pulper level

Step 3. ROTOR START

- Starts Bale pulper Rotor 121E-101-M1
- Bale handling starts warning audio alarm 120XI-115

Before going to next step, the sequence checks following conditions are met:

- 121E-101-M1 Bale pulper Rotor – RUN

- 121E-101-M1 Bale pulper, Full rotor speed – OK

Step 4. START WARNING FOR INFEED CONVEYOR

- Start delay timer T2 for start warning of feed conveyor.
  T2=5 s

Before going to next step, the sequence checks following conditions are met:

- Start delay timer T2 – ELAPSED

Step 5. START FEED CONVEYOR

- Starts Bale pulper feed conveyor
- Reduce Bale pulper Inlet Valve 121HCV-112 to 30 % opening
  This to prevent that the pulper level rise to much during bale feeding

Before going to next step, the sequence checks following conditions are met:

- Bale pulper feed conveyor – RUN

Step 6. FEEDING BALES

- Starts delay timer T3 for feed conveyor empty sequence
  T3=60 s

Before going to next step, the sequence checks following conditions are met:

- Feed conveyor delay timer T3 – ELAPSED

Step 7. STOP FEED CONVEYOR

- Stops Bale pulper feed conveyer.
- Increases Bale pulper Inlet Valve 121HC-112 opening to 100%

Before going to next step, the sequence checks following conditions are met:

- 121HCV-112 Bale pulper Inlet Valve – CLOSED
  (when $Calc_2$ is reached)
- $Calc_2$ reached

Calc 2 = Q2 -OF

Q2 =((M*(P/100))/(C1/100))-M

Parameter for over filling, OF (liters) Commissioning

Step 8. PULPING

- Timer T4 for pulping starts (set by operator).
  T4=10 min

Before going to next step, the sequence checks following conditions are met:

- Timer for pulping T4 – ELAPSED

Step 9. CHEST SELECTION

When the pulping time is complete:

- the level is checked in the selected Dump Tower, SW or HW.
- If the level in the selected Dump Tower is < 65% it is OK for dumping, the sequence will jump to preconditions prior to Step 12.
- If the level in the selected Dump Tower is >65% it is not OK for dumping, the sequence will jump to preconditions prior to Step 10.

Step 10. ROTOR SLOW DOWN

- The rotor 121E-101-M1 will slow down to Low speed while holding.

Before going to next step, the sequence checks following conditions are met:

- Selected Dump Tower level < 65% – OK

Step 11. ROTOR SPEED UP

- When selected Dump Tower is OK for dumping, the rotor speeds up.
- Timer T5 starts.
  T5=60 s

Before going to next step, the sequence checks following conditions are met:

- Chest level in selected dump tower is OK for dumping.
- Timer T5 – ELAPSED

- 121P-102 Bale pulper dilution Pump – RUN

Step 12. START DUMPING

- Opens Bale pulper Bottom Dilution Valve 121HCV-115 to 30%
- Opens Bale pulper Dump Pump Dilution Valve 121HV-116
- Start Bale pulper Dump Pump 121P-101-M1
- Opens Bale pulper Outlet Valve 121HV-102
- Timer T6 – bottom dilution valve 121HCV-115 and pump dilution valve 121HV-116 starts.
  T6=10 s

Before going to next step, the sequence checks following conditions are met:

- Timer T6 – ELAPSED
- 121P-101 Bale pulper Dump Pump – RUN

Step 13. CLOSE ROTOR FLUSH VALVE

- Closes Bale pulper Bottom Dilution Valve 121HCV-115.
- Closes Bale pulper Dump Pump Dilution Valve 121HV-116.

Before going to next step, the sequence checks following conditions are met:

- 121LI-101 Bale pulper Level – LOW

Step 14. SECOND WATER BATCH

- Open Bale pulper Inlet Valve 121HCV-112 to 50%.

Before going to next step, the sequence checks following conditions are met:

- 121LI-101 Bale pulper A Level – LOW-LOW

ROTOR SLOW DOWN

- Bale pulper Rotor 121E-101-M1 slows down.

Before going to next step, the sequence checks following conditions are met:

- 121LI-101 Bale pulper Level – Low Low Low
- 121HCV-112 Bale pulper Inlet Valve – CLOSED
- $Calc_3$ is reached.

  $Calc_3$ = Q3-OF-FL

Parameter for over filling, OF (liters)	Commissioning
Parameter for rotor flushing, FL (liters)	1000 liter

Step 15. OPEN ROTOR FLUSH VALVE

- Bale pulper A Rotor 121E-101-M1 speeds up
- Increase Bale pulper Bottom Dilution Valve 121HCV-115 opening

Before going to next step, the sequence checks following conditions are met:

- $Calc_4$ is obtained
- $Calc_4$ = Q3

  Q3 = ((M*(P/100))/(C2/100))-M

Step 16. CLOSE ROTOR FLUSH VALVE

- Closes Bale pulper Bottom Dilution Valve 121HCV-115

Before going to next step, the sequence checks following conditions are met:

- 121HCV-115 Bale pulper Bottom Dilution Valve - CLOSED
- 121LI-101 Bale pulper Level – Empty

Step 17. STOP DUMPING

- Stop Bale pulper Rotor 121E-101-M1
- Start timer T7.

  T7=10 s

Before going to next step, the sequence checks following conditions are met:

- Timer T7 – ELAPSED

Step 18. STOP PUMP

- Stop Bale pulper Dump Pump 121P-101-M1
- Close Bale pulper Outlet Valve 121HV-102

The sequence is now finished.

If in Auto Mode, the sequence will return to step 1 and hold until conditions for starting another batch are fulfilled. If in MANUAL mode, the sequence will stop.

KSDM160095160.00
Neptune
PRELIMINARY
September 16, 2020

NOM/Mill

1.5 BALE PULPING SYSTEM NEPTUNE DEP B

					APPROVALS		
Issue	**Date**	**Pages**	**Issue Description**		**By**	**Check**	**Approve**
00	20-09-16		Preliminary		NOM	FKC	
■	Entire Specification Issued this Revision		SPECIFICATION ISSUED FOR:				
			■	Review	☐	Purchase	
☐	Revised Pages Only Issued this Revision		☐	Client Approval	☐	Construction	
			☐	Enquiry	☐		

1.5 PROCESS DESCRIPTION – SW / HW PULPING SYSTEM 3
1.5.1 Concept 3
1.5.2 Functions and interlocks for the Bale pulper system 7
1.5.2.1 Definition of Terms 7
1.5.3.1 Bale pulper Rotor 121E-001-M1 9
1.5.3.2 Bale pulper Dump Pump 121P-001-M1 10
1.5.3.3 Bale pulper Level 121LI-001 11
1.5.3.4 Bale pulper Outlet Valve 121HV-002 12
1.5.3.5 Bale pulper A Dilution water 121FI-010 13
1.5.3.6 Dilution water to Bale pulper Valve 121HC-012 14
1.5.3.7 Bale pulper Bottom Dilution Valve 121HC-015 15
1.5.3.8 Bale pulper Dump Pump Dilution Valve 121HV-016 16
1.5.3.9 Bale pulper to SW Dump Tower Valve 121HV-020 17
1.5.3.10 Bale pulper to HW Dump Tower Valve 121HV-021 18
1.5.3 Bale Pulping Sequence Pulper 19

1.5 PROCESS DESCRIPTION – SW / HW PULPING SYSTEM

1.5.1 Concept

The Bale Pulping System consists of one batch pulper, 121E-001 which can feed the soft wood and hardwood lines, via the SW dump tower 122T-001 and HW dump tower 124T-001.

Pulping system Neptune

The stock is pumped from the bale pulper by the pulper dump pump 121P-001 to the selected dump tower via valves 121HV-020 or 121HV-021 (SW line or HW line) in the pulper pump discharge piping. The bale pulper has an operating volume of approximately 40 m^3 during pulping. Fill and dilution water to the pulper is supplied by the bale pulper dilution water pump 121P-002 and is fed through the top and bottom of the pulper vat. The system will normally operate in an automatic sequence, 121-DS1, as given below in 1.5.4.

Before starting or during the sequence, the operator must select if the sequence should be in AUTO or MANUAL mode. If in Auto Mode, the sequence will start over at step 1 automatically when finished. If in MANUAL mode, the sequence will stop when finished.

If the bale handling is ready to deliver bales, water valves 121HCV-012, 121HCV-015, 121HV-016 and the bale pulper dumping valve 121HV-002 are closed, the level in the bale pulper 121LI-001 is empty and the pulper dilution tank level is OK, the water filling of the pulper can start.

The bale pulper inlet valve 121HCV-012 will open and water from the pulper dilution tank 121T-001 will start to fill the bale pulper to a pre-set level. To get the right amount of water into the pulper this valve must start to close before the right amount has been

filled in the pulper, to prevent overfilling. The time difference for when the valve needs to start closing (OF) will be set during commissioning. A flow indicator 121FI-010 will measure the amount of water that has been added to the pulper.

The total fill water required to start feeding bales (pre-set pulper level), the total feed water required to start the pulping sequence and the total feed water required to start discharge of the pulper will be calculated based on below parameters to provide sufficient water to give a pulping consistency of approximately 7% and a dump consistency of approximately 5%.

The operator will provide values to the following parameters for the water calculation:

Bale dryness, P (%)	Default 90% (80-100%)
Bale weight, M (kg)	From weight cells
Consistency pulping, C_1 (%)	Default 7.0% (6.0-8.5%)
Consistency dumping, C_2 (%)	Default 5.0% (4.5-5.5%)
White water for first filling, Q1 (% level)	Bale pulper level
White water for pulping, $Calc_2$ (liters)	(only calculation)
White water for dump, $Calc_3$ (liters)	(only calculation)
Total white-water volume, $Calc_4$ (liters)	(only calculation)
Parameter for over filling, OF (liters)	Default value
Parameter for rotor flushing, FL (liters)	Default value

The level for feeding bales (Q1), pulping water ($Calc_2$) and dump water ($Calc_3$) required are calculated from the following equations (taking the water consistency C_{water} = 0.0%):

WW to start feeding bales into the pulper Q1

Minimum filling level to start feeding the bales, default value 40% (to be adjusted at start-up)

WW for pulping, 7% consistency:

Q2 =((M*(P/100))/(C1/100))-M

Calc $_2$ = Q2 -OF

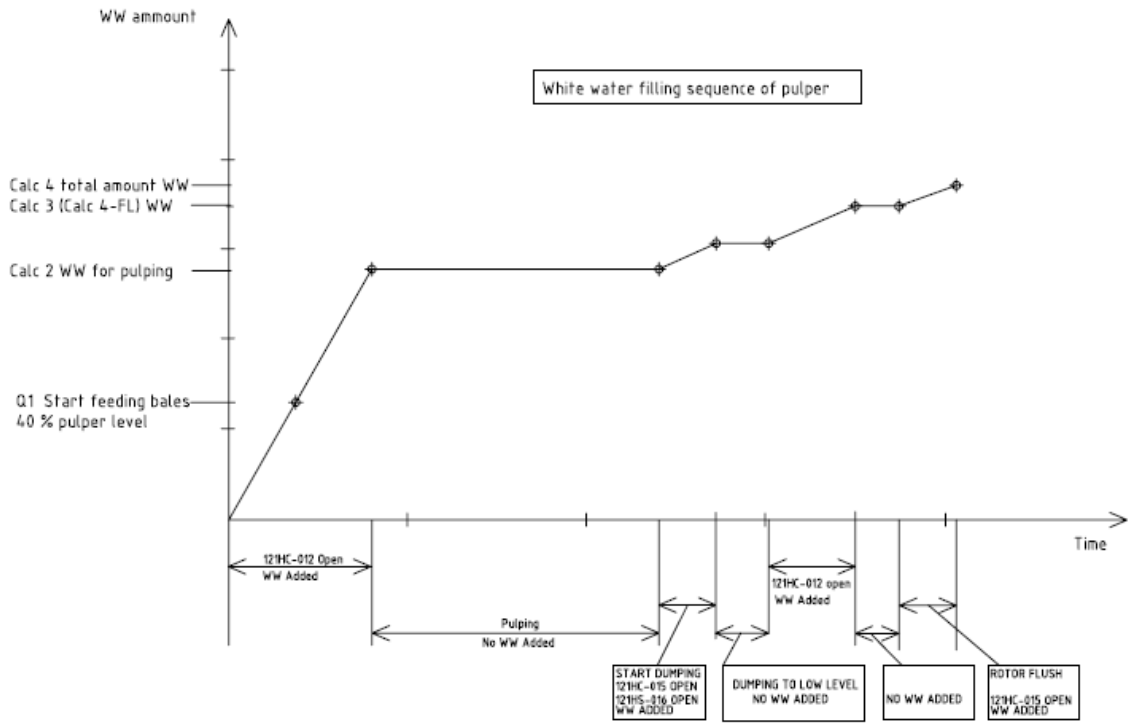
WW for dumping, 5 % consistency:

Q3=((M*(P/100))/(C2/100))-M

Calc$_3$ = Q3-OF-FL

Calc$_4$ =Q3

The total amount of water needed for a whole batch is determined by calc$_4$, the amount of water calculated in calc $_2$ and calc$_3$ are steps to reach calc$_4$ so they should not be added to each other.



White water inlet valve 121HC-012 opens and when the pulper level reaches the pre-set level (Q1), the pulper rotor will start and the required furnish will be fed into the pulper by the pulper feed conveyor. When reaching the calculated volume $Calc_2$, bale pulper inlet valve 121HCV-012 closes. The pulping period will then commence and last for a pre-set period of approximately 10 minutes. The pulping times can be set by the operator.

In the end of the pulping period the status of the selected dump tower will be checked and, provided there is enough free volume to accept a batch, the dump cycle will start. If the dump tower level 122LI-001 or 124LI-001, for SW line or HW line dump tower respectively, are too high the rotor will ramp down to slow speed until the level is OK for dumping. When the level is OK for dumping, the rotor speed will ramp up before the dumping sequence continues.

Bale pulper bottom dilution valve 121HCV-015 will open and bale pulper dump pump dilution valve 121HV-016 will open for a pre-set time at the start of the dumping, this to ensure that the pulp will be pumped out of the pulper. Bale pulper dump pump 121P-001 will start and bale pulper outlet valve 121HV-002 will open.

When the pulper reaches Low level 121LI-001, Bale pulper inlet valve 121HCV-012 will open and bale pulper bottom dilution valve 121HCV-015 will close. Dilution water is filled into the pulper until the calculated volume $Calc_3$ is reached.

When the pulper reaches the level Low-Low, bale pulper rotor 121E-001-M1 will slow down. When the pulper level reaches Low-low-low, bale pulper bottom dilution valve 121HCV-015 opens to flush the rotor until the calculated volume $Calc_4$ is reached. Then the bale pulper rotor will stop, bale pulper dump pump 121P-001-M1 will stop after a delay and bale pulper outlet valve 121HV-002 will close. The bale pulper pulping sequence is then completed and automatically resets to be ready for the next batch.

1.5.2 Functions and interlocks for the Bale pulper system

1.5.2.1 Definition of Terms

Loop and Valve Number

Loop identification number.

Process Function

A brief description of the loop operation

Point of Control

Whether DCS or local control.

Graphic Display

Title of graphic display

Permissives

A signal required that allows the equipment to be started. Once the equipment is in operation it will continue to operate even if the permissive signal is lost. This signal is required in all control modes unless stated otherwise.

Interlocks

A signal required to start and to continue to operate equipment. Without the interlock signal the equipment will not operate. The equipment will stop operating if it is operating when the signal is lost. This signal is required in all control modes unless stated otherwise.

Manual Mode

Description of manual operation requirements. The equipment must be selected in MANUAL for this operation.

Auto Mode

Description of automatic operation requirements. The equipment must be selected in AUTOMATIC for this operation.

Remote Function

Description of cascade operation requirements or when controlled by a remotely calculated set point. The equipment must be selected in REMOTE for this operation.

Indication

Definition of device status indications and location of indications.

Interlock limits

Definition of interlock requirements.

Alarms

Definition of alarm requirements.

1.5.3.1 Bale pulper Rotor 121E-001-M1

Motor Number

121E-001-M1

Process Function

The rotor breaks up and slushes the baled pulp in the pulper. The motor is speed controlled.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The rotor will stop/will not start if:

- The sealing water pressure, 180PC-117, is Low.

Manual Mode

The rotor is started and stopped by the operator via the DCS

Auto Mode

The Bale pulper rotor is controlled by the Pulping sequence 1.5.4.

Indication

Standard motor display

Motor current display

Motor speed control display

1.5.3.2 Bale pulper Dump Pump 121P-001-M1

Motor Number

121P-001-M1

Process Function

The pump directs stock from Bale pulper A, 121E-001, to the SW line or the HW line Dump Towers, 122T-001 or 124T-001.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The pump will stop/will not start if:

- Bale pulper Level 121LI-001 is at empty level to be set during commissioning, time delay.
- Bale pulper outlet valve 121HS-002 have not reached open limit 121GS2-002 in 10 s after that pump have started.
- The sealing water pressure, 180PC-117, is Low.
- High level for SW and HW dump towers
- 121HV-020 SW dump tower valve, if closed and SW is selected
- 121HV-021 HW dump tower valve, if closed and HW is selected

Manual Mode

The pump is started and stopped by the operator via the DCS

Auto Mode

The pump is controlled by the Pulping sequence 1.5.4.

Indication

Standard motor display

1.5.3.3 Bale pulper Level 121LI-001

Loop Number

121LI-001

Process Function

The loop indicates the level in Bale pulper, 121E-001.

Point of Indication

At DCS only, no local indication

Graphic Display

Pulping system graphic

Indication

Standard analogue display

121LT-001 – Pulper level transmitter, AI

Interlocking limits

Pulper Empty, Low-Low-Low, Low-Low, Low, OK for dumping, High, High-High

Alarm Limits

High, High-High

1.5.3.4 Bale pulper Outlet Valve 121HV-002

Loop and Valve Number

121HS-002 / 121HV-002

Process Function

The valve feeds the pulp from bale pulper dump pump to SW Dump tower 122T-001 or HW Dump tower 124T-001.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

None

Manual Mode

The valve is opened and closed by the operator via the DCS

Auto Mode

The valve will be forced to Auto Mode and open when Bale pulper Dump Pump 121P-001-M1 starts and will close when Bale pulper Dump Pump stops. The valve operation will be controlled as part of the Pulping sequence 1.5.4.

Indication

Standard digital valve display, two limit switches

121GS1-002 – Closed position, DI

1.5.3.5 Bale pulper A Dilution water 121FI-010

Loop Number

121FI-010

Process Function

The loop indicates the flow and total cumulative volume of dilution water added to the pulper as part of the Pulping sequence 1.5.4.

Point of Indication

At DCS only, no local indication

Graphic Display

Pulping system graphic

Indication

Standard analogue display

121FT-010 – Dilution water flow transmitter, AI

Alarm Limits

High-High

1.5.3.6 Dilution water to Bale pulper Valve 121HC-012

Loop and Valve Number

121HC-012 / 121HCV-012

Process Function

The valve controls the addition of fill and dilution water supplied in the top of Bale pulper, 121E-001.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The flow control loop output signal will go to 0% in forced control if:

- Bale pulper Level 121LI-001 is High-High.

Manual Mode

The analogue output from the control loop is increased and decreased by the operator at the DCS and opens / closes the valve.

Auto Mode

The valve operation will be controlled as part of the Pulping sequence 1.5.4.

Indication

Standard PID loop display, output range 0-100%.

121HCV-012– Dilution water to Bale pulper control valve, AO

1.5.3.7 Bale pulper Bottom Dilution Valve 121HC-015

Loop and Valve Number

121HC-015 / 121HCV-015

Process Function

The valve controls the addition of water to the Bale pulper 121E-001 rotor screen plate.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The flow control loop output signal will go to 0% in forced control if:

- Bale pulper Level 121LI-001 is High-High.

Manual Mode

The analogue output from the control loop is increased and decreased by the operator at the DCS and opens / closes the valve.

Auto Mode

The valve operation will be controlled as part of the Pulping sequence 1.5.4.

Indication

Standard PID loop display, output range 0-100%.

121HCV-015 – Flow control valve, AO

1.5.3.8 Bale pulper Dump Pump Dilution Valve 121HV-016

Loop and Valve Number

121HS-016 / 121HV-016

Process Function

The valve controls the addition of dilution water to the suction line of Bale pulper Pump 121P-001.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The valve will not open if:

- Bale pulper Level 121LI-001 is High-High

Manual Mode

The analogue output from the control loop is increased and decreased by the operator at the DCS and opens / closes the valve.

Auto Mode

The valve operation will be controlled as part of the Pulping sequence 1.5.4.

Indication

Standard digital valve display, two limit switches

121GS1-016 – Closed position, DI

1.5.3.9 Bale pulper to SW Dump Tower Valve 121HV-020

Loop and Valve Number

121HS-020 /121HV-020

Process Function

The loop controls the discharge of stock from Bale pulper 121E-001 to SW Dump Tower 122T-001.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The valve will not open if:

- Bale pulper to HW dump valve is selected open.

Manual Mode

No manual mode.

Auto Mode

The valve will open when SW Dump Tower is selected by the operator. The valve will close when HW Dump Tower is selected. The valve operation will be controlled as part of the Pulping sequence 1.5.4.

Indication

Standard digital valve display, two limit switches

121GS1-020 – Closed position, DI

1.5.3.10 Bale pulper to HW Dump Tower Valve 121HV-021

Loop and Valve Number

121HS-021 / 121HV-021

Process Function

The loop controls the discharge of stock from Bale pulper 121E-001 to HW Dump Tower 124T-001.

Point of Control

DCS only, no local operation

Graphic Display

Pulping system graphic

Interlocks

The valve will not open if:

- Bale pulper to SW dump valve is selected open.

Manual Mode

No manual mode.

Auto Mode

The valve will open when HW Dump Tower is selected by the operator. The valve will close when SW Dump Tower is selected. The valve operation will be controlled as part of the Pulping sequence 1.5.4.

Indication

Standard digital valve display, two limit switches

121GS1-021 – Closed position, DI

1.5.3 Bale Pulping Sequence Pulper

Note that all interlocks are valid all times and will override any sequence logic where applicable.

Note that the sequence logic is valid only whilst the sequence is active but will override any other logic (with exception of interlocks) during that time where applicable.

Ensure all manual valves are set properly.

Ensure all manually operated on/off valves are set properly.

Ensure seal water is being fed to all relevant equipment.

Ensure all set point values are set properly.

The operator will be given the possibility to change the following parameters:

- Pulping time SW or HW, 10 min (range 7-12 min)
- Select line: No1 or No2 Dump Tower

Sequence Permissive

Prior to a sequence the operator should ensure, either by pressing the dissolving sequence All-Auto button on the screen or by going through each drive/loop manually, check following:

- 121HV-002 Bale pulper Outlet Valve in auto
- 121FI-010 Bale pulper Dilution water in auto
- 121HCV-012 Bale pulper Inlet Valve in auto
- 121HCV-015 Bale pulper Bottom Dilution Valve in auto
- 121HV-016 Bale pulper Dump Pump Dilution Valve in auto
- 121HV-020 Bale pulper to SW Dump Tower Valve in auto
- 121HV-021 Bale pulper to HW Dump Tower valve in auto

- 121P-001-M1 Bale pulper Dump Pump in auto
- 121E-001-M1 Bale pulper Rotor in auto
- Enough level in pulper dilution tank 121LC-022 (min 30%)
- 121P-002 Pulper dilution pump in auto
- Bale pulper feed conveyor in auto, 120HS-007
- Bales at top of feed conveyor, 121GS2-007
- Emergency stop is OK

Sequence start

Before starting or during the sequence, the operator must select if the sequence should be in AUTO or MANUAL mode. If in Auto Mode, the sequence will start over at step 1 automatically when finished. If in MANUAL mode, the sequence will stop when finished. If the sequence is placed into Manual at any time during the Pulping sequence, the sequence will stop after the last step is completed.

Step 1. START DISSOLVING SEQUENCE

Before starting the sequence, the following conditions need to be met if SW batch is selected:

- Bale pulper feed conveyor in auto, 120HS-007
- Bales at top of feed conveyor, 121GS2-007
- Storage conveyor in auto. 120HS-003
- Bale at end of storage conveyor, 120GS2-003
- Emergency stop is OK
- Pulping sequence is not ongoing.

Before starting the sequence, the following conditions need to be met if HW batch is selected:

- Bale pulper feed conveyor in auto, 120HS-107

- Bales at top of feed conveyor, 121GS2-107
- Storage conveyor in auto. 120HS-103
- Bale at end of storage conveyor, 120GS2-103
- Emergency stop is OK
- Pulping sequence is not ongoing.

Before going to next step, the sequence checks following conditions are met:

- 121HCV-012 Bale pulper Inlet Valve – Closed
- 121HCV-015 Bale pulper Bottom Dilution Valve – Closed
- 121HV-016 Bale pulper Dump Pump Dilution Valve – Closed
- 121HV-002 Bale pulper Outlet Valve – Closed
- 121LI-001 Bale pulper Level – Empty
- 121P-002 Bale pulper Dilution Pump – RUN
- Enough level in pulper dilution tank 121LC-022 (min 30%)

Step 2. WATER BATCH 1ST FILLING

- Resets Bale pulper Inlet Flow Totalizer 121FI-010
- Open Bale pulper Inlet Valve 121HCV-012

Before going to next step, the sequence checks following conditions are met:

- 121LI-001 Bale pulper Level Q1 reached – OK for feeding bales
  Q1=40% pulper level

Step 3. ROTOR START

- Start Bale pulper Rotor 121E-001-M1
- Bale handling starts warning audio alarm 120XI-015

Before going to next step, the sequence checks following conditions are met:

- 121E-001-M1 Bale pulper Rotor – RUN

- 121E-001-M1 Bale pulper, Full rotor speed – OK

Step 4. START WARNING FOR INFEED CONVEYOR

- Start delay timer T2 for start warning of feed conveyor.
  T2=5 s

Before going to next step, the sequence checks following conditions are met:

- Start delay timer T2 – ELAPSED

Step 5. START FEED CONVEYOR

- Starts Bale pulper feed conveyor
- Reduce Bale pulper Inlet Valve 121HCV-012 to 30 % opening
  This to prevent that the pulper level rise to much during bale feeding

Before going to next step, the sequence checks following conditions are met:

- Bale pulper feed conveyor – RUN

Step 6. FEEDING BALES

- Starts delay timer T3 for feed conveyor empty sequence
  T3=60 s

Before going to next step, the sequence checks following conditions are met:

- Feed conveyor delay timer T3 – ELAPSED

Step 7. STOP FEED CONVEYOR

- Stops Bale pulper feed conveyer.
- Increases Bale pulper Inlet Valve 121HC-012 opening to 100%

Before going to next step, the sequence checks following conditions are met:

- 121HCV-012 Bale pulper Inlet Valve – CLOSED
  (when $Calc_2$ is reached)
- $Calc_2$ reached

Calc 2 = Q2 -OF

Q2 =((M*(P/100))/(C1/100))-M

Parameter for over filling, OF (liters) Commissioning

Step 8. PULPING

- Timer T4 for pulping starts (set by operator).
  T4=10 min

Before going to next step, the sequence checks following conditions are met:

- Timer for pulping T4 – ELAPSED

Step 9. CHEST SELECTION

When the pulping time is complete:

- the level is checked in the selected Dump Tower, SW or HW.
- If the level in the selected Dump Tower is < 65% it is OK for dumping, the sequence will jump to preconditions prior to Step 12.
- If the level in the selected Dump Tower is >65% it is not OK for dumping, the sequence will jump to preconditions prior to Step 10.

Step 10. ROTOR SLOW DOWN

- The rotor 121E-001-M1 will slow down to Low speed while holding.

Before going to next step, the sequence checks following conditions are met:

- Selected Dump Tower level < 65% – OK

Step 11. ROTOR SPEED UP

- When selected Dump Tower is OK for dumping, the rotor speeds up.
- Timer T5 starts.
  T5=60 s

Before going to next step, the sequence checks following conditions are met:

- Chest level in selected dump tower is OK for dumping.
- Timer T5 – ELAPSED

- 121P-002 Bale pulper dilution Pump – RUN

Step 12. START DUMPING

- Opens Bale pulper Bottom Dilution Valve 121HCV-015 to 30%
- Opens Bale pulper Dump Pump Dilution Valve 121HV-016
- Start Bale pulper Dump Pump 121P-001-M1
- Opens Bale pulper Outlet Valve 121HV-002
- Timer T6 – bottom dilution valve 121HCV-015 and pump dilution valve 121HV-016 starts.
  T6=10 s

Before going to next step, the sequence checks following conditions are met:

- Timer T6 – ELAPSED
- 121P-001 Bale pulper Dump Pump – RUN

Step 13. CLOSE ROTOR FLUSH VALVE

- Closes Bale pulper Bottom Dilution Valve 121HCV-015.
- Closes Bale pulper Dump Pump Dilution Valve 121HV-016.

Before going to next step, the sequence checks following conditions are met:

- 121LI-001 Bale pulper Level – LOW

Step 14. SECOND WATER BATCH

- Open Bale pulper Inlet Valve 121HCV-012 to 50%.

Before going to next step, the sequence checks following conditions are met:

- 121LI-001 Bale pulper Level – LOW-LOW

Step 15. ROTOR SLOW DOWN

- Bale pulper Rotor 121E-001-M1 slows down.

Before going to next step, the sequence checks following conditions are met:

- 121LI-001 Bale pulper Level – Low Low
- 121HCV-012 Bale pulper Inlet Valve – CLOSED
- $Calc_3$ is reached.

  $Calc_3$ = Q3-OF-FL

Parameter for over filling, OF (liters)	Commissioning
Parameter for rotor flushing, FL (liters)	1000 liter

Step 16. OPEN ROTOR FLUSH VALVE

- Bale pulper Rotor 121E-001-M1 speeds up
- Increase Bale pulper Bottom Dilution Valve 121HCV-015 opening

Before going to next step, the sequence checks following conditions are met:

- $Calc_4$ is obtained
- $Calc_4$ = Q3

  Q3 = ((M*(P/100))/(C2/100))-M

Step 17. CLOSE ROTOR FLUSH VALVE

- Closes Bale pulper Bottom Dilution Valve 121HCV-015

Before going to next step, the sequence checks following conditions are met:

- 121HCV-015 Bale pulper Bottom Dilution Valve - CLOSED
- 121LI-001 Bale pulper Level – Empty

Step 18. STOP DUMPING

- Stop Bale pulper Rotor 121E-001-M1

- Start timer T7.
  T7=10 s

Before going to next step, the sequence checks following conditions are met:

- Timer T7 – ELAPSED

Step 19. STOP PUMP

- Stop Bale pulper Dump Pump 121P-001-M1
- Close Bale pulper Outlet Valve 121HV-002

The sequence is now finished.

If in Auto Mode, the sequence will return to step 1 and hold until conditions for starting another batch are fulfilled. If in MANUAL mode, the sequence will stop.

1.1 BALE HANDLING NEPTUNE HW LINE

						APPROVALS		
Issue	**Date**	**Pages**	**Issue Description**			**By**	**Check**	**Approve**
00	20-09-16		Preliminary			NOM	FKC	
■	Entire Specification Issued this Revision		SPECIFICATION ISSUED FOR:					
			■	Review		☐	Purchase	
☐	Revised Pages Only Issued this Revision		☐	Client Approval		☐	Construction	
			☐	Enquiry		☐		

TABLE OF CONTENTS

1 PURPOSE OF THE FUNCTIONAL DESCRIPTION 1
2 GENERAL 1
3 FUNCTIONAL DESCRIPTION 3
3.1 **GENERAL** 3
3.1.1 Main equipment 3
3.1.2 Electrical equipment and components 4
3.1.3 Weighing system 6
3.1.4 Local controls 7
3.1.5 Indications 9
3.2 **FUNCTIONAL DESCRIPTION OF THE PULPER FEED SYSTEM** 10
3.2.1 General 10
3.2.2 Bale loading and de wiring of bales on de wiring conveyor 120E-004 10
3.2.3 Storage of bales on storage conveyor 120E-005 13
3.2.4 Pulper feeding of bales by pulper feed conveyor 120E-006 14
3.2.5 Local controls 16
3.2.6 Indications 17
3.2.7 Bale handling emergency stops 18
4 REFERENCES TO OTHER DOCUMENTS 21
5 FUNCTIONS AND INTERLOCKS FOR THE BALE HANDLING 22
5.1.1 Definition of Terms 22
5.1.2 De-wiring conveyor 120E-004 24
5.1.3 Storage conveyor 120E-005 26
5.1.4 Pulper feed conveyor 120E-006 27
5.1.5 Bale release sensor - 120GS-021 29
5.1.6 De-wiring conveyor Bale loading position at inlet end 120GS1-022 30
5.1.7 De-wiring conveyor Bale loading position at outlet end - 120GS2-022 31
5.1.8 De-wiring conveyor remote/local selector switch – 120HS1-022A and 120HS1-022B 32
5.1.9 De-wiring conveyer forward / reverse selector switch 120HS2-022A/B 33
5.1.10 De wiring complete HW illuminated push button 120HSI2-022A/B 34
5.1.11 Storage conveyor at inlet end 120GS1-023 35
5.1.12 Storage conveyer Bale loading position at outlet end - 120GS2-023 36
5.1.13 Storage conveyor remote/local selector switch – 120HS1-023A and 120HS1-023B 37
5.1.14 Storage conveyer forward / reverse selector switch 120HS2-023A/ 120HS2-003B 38
5.1.15 Lifting beam selector switch 120HS1-024A/B 39
5.1.16 Lifting beam up 120HSV1-024A 40
5.1.17 Lifting beam down 120HSV1-024B 41
5.1.18 Pulper feed conveyor Reverse interlock sensor 120GS1-027 42
5.1.19 Pulper feed conveyor loaded switch 120GS2-027 43
5.1.20 Pulper feed conveyor remote/local switch – 120HS1-027A/120HS1-027B 44
5.1.21 Pulper feed conveyer forward / reverse switch 120HS2-027A/120HS2-027B 45
5.1.22 Audio alarm "pre-warning conveyors start" – 120XI-035 46
5.1.23 Load SW de-wiring conveyor 120XI-037 47
5.1.24 Light indicator "Conv. Busy"120XI-039 48
5.1.25 Weighing system – 120WI-030 49
5.1.26 Conveyor system control desk 120CD-002 51
5.1.27 Emergency stop bale handling 120HZ2-995 52
5.1.28 De-wiring conveyor rope pull safety switch 120GZ7,8-995 53

5.1.29 Pulper feed conveyor rope pull safety switch 120GZ9,10-995 54
5.1.30 Pulper feed conveyor rope pull safety switch 120GZ11,12-995 55
5.1.31 Emergency stop reset illuminated push button 120HSI2-995A/B 56
5.2 CONVEYOR SEQUENCE 57
5.2.1 Start sequence 1 58
5.2.2 Start sequence 2 60
5.2.3 Start sequence 3 62

1 PURPOSE OF THE FUNCTIONAL DESCRIPTION

The purpose of this document is to give a general view of the function of the equipment included in the delivery from Valmet.

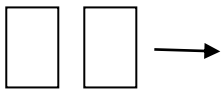
The functional description is to be used by electrical designers, programmers of the automation system as well as process operators.

Only process functions and interlocks are described in this function description. Basic MCC interlocks, MCC faults, measurement faults, valve position monitoring and other common standard functions that are applied to all zones are not described in this function description. Only if exceptions are needed, they will be mentioned case by case in this description.

2 GENERAL

The bale handling system brings virgin pulp bales from the pulp yard to the pulper for slushing in a batch sequence. The system consists of a de-wiring conveyor of type MDB, a storage conveyor and a pulper feed conveyor of type CHB-FD.

The bales are loaded as stacks of bales by a forklift truck. The bales are oriented with the long side in the conveyor transport direction.



De stacking is done on the de-wiring conveyor by the forklift operator following the signals on the indicator bank. As many bales as required in the batch are loaded onto the conveyor. The de-wiring conveyor cannot take the whole batch so the de-wiring must be done in two sequences.

When the first set of bales have been loaded the operator lifts all bales with a lifting beam integrated in the conveyor. The bale wires are then manually cut and removed by hand.
A second set of bales are thereafter loaded and de-wired. When de-wiring is completed the operator lowers the bales onto the conveyor chains and acknowledges the completion of the de-wiring sequence. The bales then continue to the intermediate storage conveyor.

The final batch of bales standing on the pulper feed conveyor and the storage conveyor is weighed all together and brought to the pulper inlet chute for slushing.

3 FUNCTIONAL DESCRIPTION

3.1 GENERAL

3.1.1 Main equipment

Main equipment included in the pulper feed system are shown in Figure 1 and described in Table 1.

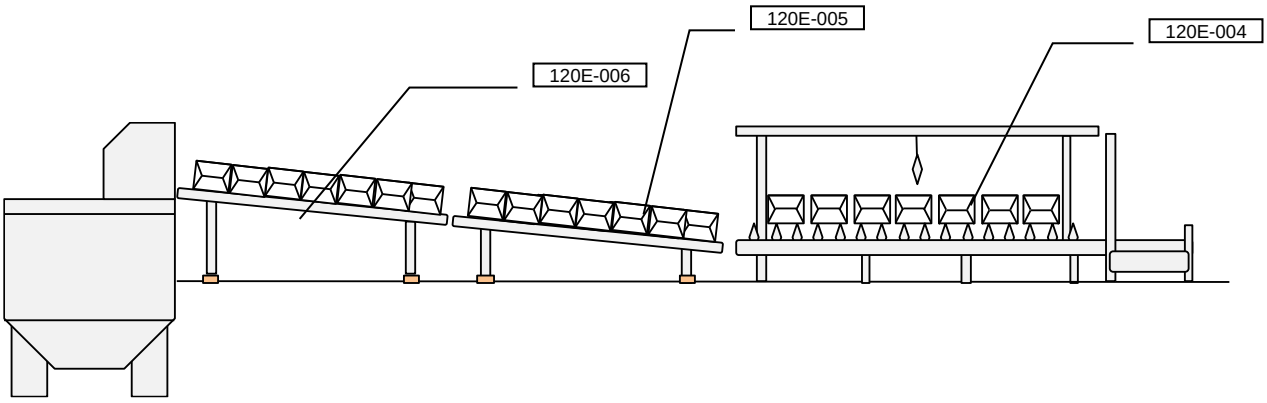


Figure 1 Main equipment included in the pulper feed system

Table 1 Description of main equipment in the pulper feed system

Standard Item/Tag	Function	Description
120E-004	De-wiring of bales	Manual de-wiring conveyor, type MDB3115H07-L Conveying speed 0.1 - 0.3 m/s (VFD)
120E-005	Intermediate storage of bales	Storage conveyor, type CHB370-FD Conveying speed 0.1 - 0.3 m/s (VFD)
120E-006	Pulper feeding of bales	Storage conveyor, type CHB370-FD Conveying speed 0.1 - 0.3 m/s (VFD)

3.1.2 Electrical equipment and components

Electrical equipment and components are shown in Figure 2 and described in Table 2.

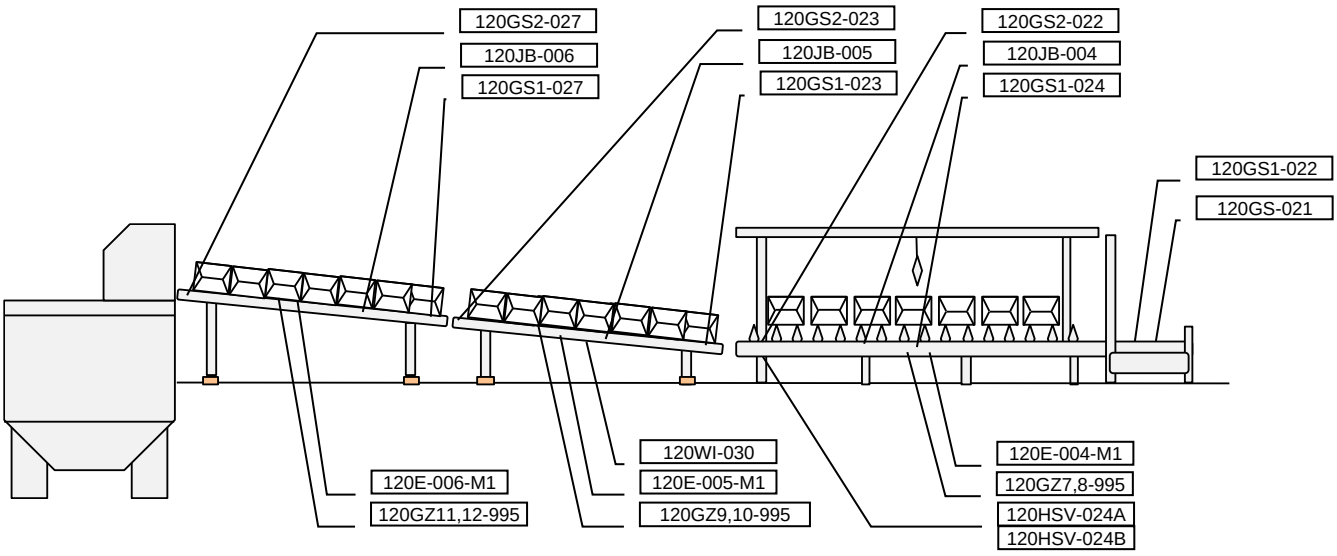


Figure 2 Electrical equipment and components included in the pulper feed system

Table 2 Description of electrical components included in the pulper feed system

Item/Tag	Device	Function
120E-004-M1	Motor	Electrical gear motor for de-wiring conveyor
120JB-004	Junction box	Junction box for conveyor
120GS-021	Photocell	Bale release sensor
120GS1-022	Limit switch	Bale loading position at inlet end
120GS2-022	Limit switch	Bale stop position at outlet end
120GS1-024	Limit switch	Lifting beam in lower position
120HSV-024A	Pneumatic valve – coil 14	Lifting beam up
120HSV-024B	Pneumatic valve – coil 12	Lifting beam down
120GZ7,8-995	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120E-005-M1	Motor with brake	Electrical gear motor with brake for storage conveyor

Item/Tag	Device	Function
120JB-005	Junction box	Junction box for conveyor
120GS1-023	Limit switch	Junction box for conveyor
120GS2-023	Limit switch	Bale loading position at inlet end
120GZ9,10-995	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120GS1-027	Limit switch	Bale loading position at inlet end
120GS2-027	Limit switch	Bale stop position at outlet end
120GZ11,12-995	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120E-006-M1	Motor with brake	Electrical gear motor with brake for storage conveyor
120JB-006	Junction box	Junction box for conveyor
120WI-030	Weighing system	Batch weight

3.1.3 Weighing system

The weighing system is shown in Figure 3 and described in Table 3.

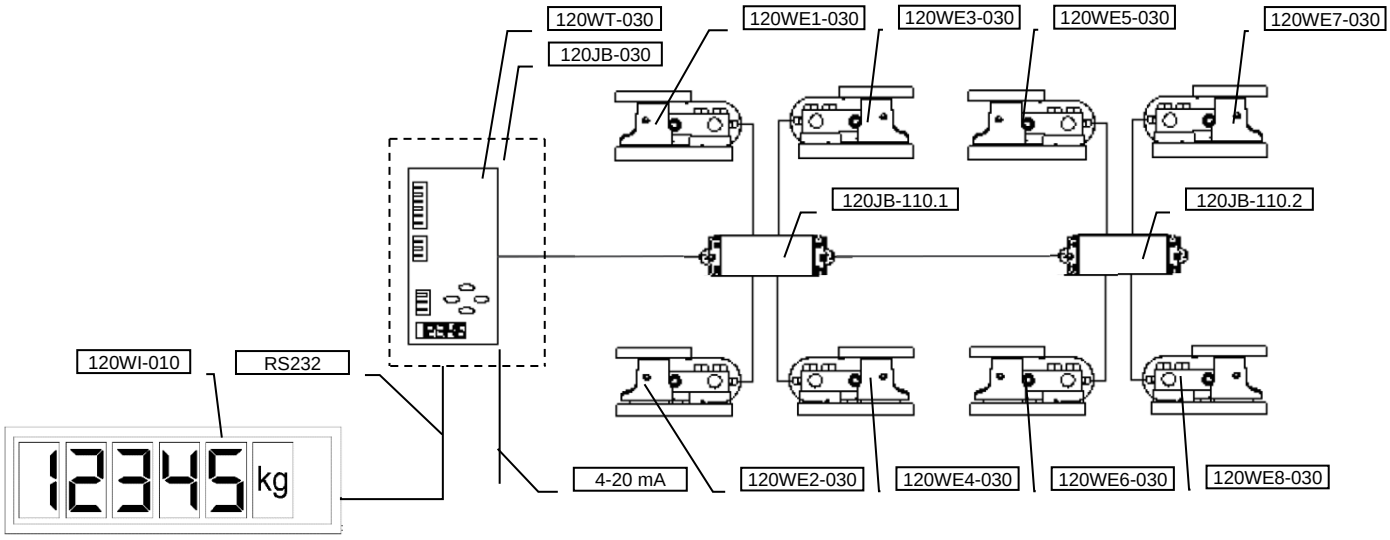


Figure 3 Weighing system with eight load cells

Table 3 Description of the weighing system

Customer Item/Tag	Device	Function
120WI-030	External display	Large display to visualize the loaded weight for the operator
120WT-030	Weighing terminal	Weighing terminal with weight indication
120JB-030	Junction box	Junction box for the weighing terminal
120JB-030.1	Load cell junction box #1	Precision junction box for multiple load cell connection
120JB-030.2	Load cell junction box #2	Precision junction box for multiple load cell connection
120WE1-030	Load cell #1	Load cell for weight registration
120WE2-030	Load cell #2	Load cell for weight registration
120WE3-030	Load cell #3	Load cell for weight registration
120WE4-030	Load cell #4	Load cell for weight registration
120WE5-030	Load cell #5	Load cell for weight registration
120WE6-030	Load cell #6	Load cell for weight registration
120WE7-030	Load cell #7	Load cell for weight registration
120WE8-030	Load cell #8	Load cell for weight registration

3.1.4 Local controls

Local controls are shown in Figure 4 and described in Table 4.

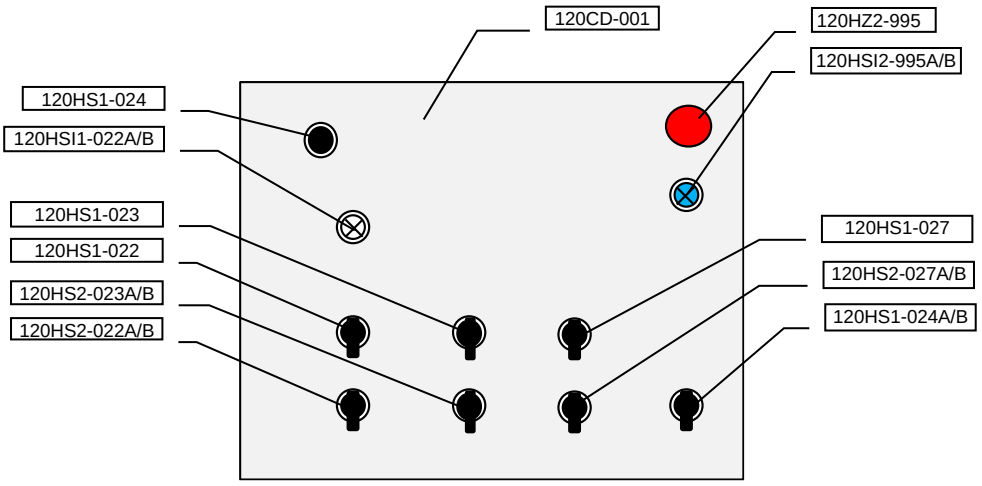


Figure 4 Local controls in the pulper feed system

Table 4 Description of electrical components for control of the pulper feed system

Customer Item/Tag	Device	Function	Color
120CD-002	Control desk	Local control desk for the pulper feed system	-
120HZ2-995	Mushroom push button	Emergency stop	Red
120HSI2-995	Illuminated push button	Emergency stop reset	-
120HSI2-995A	Push button	Reset function	-
120HSI2-995B	Indication lamp	Emergency stop tripped	Blue
120HSI1-022	Illuminated push button	De-wiring completed	-
120HSI1-022A	Push button	De-wiring completed	-
120HSI1-022B	Indication lamp	De-wiring completed acknowledgement	White
120HS1-024	Push button	Hold to run	White
120HS1-024A	Selector Switch position right	Lifting beam up	-
120HS1-024B	Selector Switch position left	Lifting beam down	-

Table continued on next page

Table 4 Continuation from previous page

Customer Item/Tag	Device	Function	
120HS1-022	Selector Switch	Conveyor 120E-001 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-001 Remote mode	-
-	Selector Switch position left	Conveyor 120E-001 Local mode	-
120HS2-022	Selector Switch	Conveyor 120E-001 Forward/0/Reverse operation	Black
120HS2-022A	Selector Switch position right	Conveyor 120E-001 Forward	-
120HS2-022B	Selector Switch position left	Conveyor 120E-001 Reverse	-
120HS1-023	Selector Switch	Conveyor 120E-002 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-002 Remote mode	-
-	Selector Switch position left	Conveyor 120E-002 Local mode	-
120HS2-023	Selector Switch	Conveyor 120E-002 Forward/Reverse operation	Black
120HS2-023A	Selector Switch position right	Conveyor 120E-002 Forward	-
120HS2-023B	Selector Switch position left	Conveyor 120E-002 Reverse	-
120HS1-027	Selector Switch	Conveyor 120E-003 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-003 Remote mode	-
-	Selector Switch position left	Conveyor 120E-003 Local mode	-
120HS2-027	Selector Switch	Conveyor 120E-003 Forward/Reverse operation	Black
120HS2-027A	Selector Switch position right	Conveyor 120E-003 Forward	-
120HS2-027B	Selector Switch position left	Conveyor 120E-003 Reverse	-

3.1.5 Indications

Indications are shown in Figure 5 and described in Table 5.

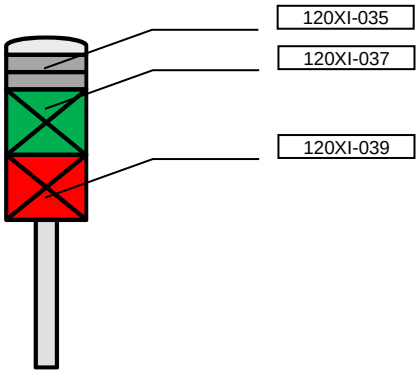


Figure 5 Indicator bank for the de-wiring conveyor

Table 5 Description of the indicator bank for the de-wiring conveyor

Customer Item/Tag	Device	Description	Color
120XI-035	Alarm horn	Auditory signal PRODUCTION START	-
120XI-037	Visual signal	Production started (fixed light) LOAD BALES Loading of bales completed (flashing light) DEWIRE BALES	Green
120XI-039	Visual signal	Loading conveyor full or running / Pulper production stopped (fixed light) CONVEYOR BUSY / PRODUCTION STOP	Red

3.2 FUNCTIONAL DESCRIPTION OF THE PULPER FEED SYSTEM

3.2.1 General

Automation controls are realized by a distributed control system (DCS). The pulping controls are operated from the stock preparation control room or paper machine control room. In addition, there are some local controls which are operated from a local control desk, 120CD-002. The pulper feed system can individually be operated in either remote or local mode. In remote mode the conveyors respond to the manual de-wiring and production demand in accordance with a predefined logic. In local mode it is possible to manually run the conveyors according to specific needs, e.g. during service or cleaning. The following sections give conceptual descriptions of operation in the two different modes.

Process settings, like values for timers and distance between bales are adjustable from the DCS. All settings are behind password.

The functional description foresees the use of variable frequency drive (VFD) on the pulper feed conveyor.

3.2.2 Bale loading and de wiring of bales on de wiring conveyor 120E-004

Function Bale loading and de-wiring

A stack of bales, normally consisting of three or four bales, is loaded onto the de-wiring conveyor 120E-001. Loading is allowed only if the green lamp 120XI-037 is lit.

The forklift driver loads one stack of bales activating limit switch 120GS1-022 located at the loading position of the de-wiring conveyor 120E-004. The forklift driver then takes a new grip and lifts the remaining stack of bales to release the

bottom bale still resting on the conveyor chains. A bale release sensor 120GS-021 prevents the de-wiring conveyor from starting if the stack is not lifted.

When a bale is detected on limit switch 120GS1-022 and the bale release sensor is deactivated, the loading conveyor is started after a preset time [timer #1]. The bale is then forwarded to give space to load another bale [timer # 2]. When [timer #2] has run out the conveyor is stopped, and the forklift driver puts down the remaining bales in the vacated position.

When a set of bales (normally 7) have been loaded [counter #1] the green light starts flashing indicating that the de-wiring conveyor is full, and that manual de-wiring of the bales can be performed safely. The operator then lifts the batch of bales by pressing and holding the “hold to run” button 120HS1-024 and the use the selector switch 120HS1-024A/B for activating the conveyor lifting beam. The lifting beam can only be lifted if motor 120E-004-M1 is not running. All bales must be positioned within the operating length of the lifting beam before lifting can commence. The bale wires are manually cut and removed by hand. The lift beam is thereafter lowered by using the same pushbutton 120HS1-024 and selector switch 120HS1-024A/B.

The completion of the de-wiring is acknowledged by the operator by pressing the button 120HSI1-022. A white lamp is lit confirming the acknowledgement by the DCS. All bales are then forwarded to the stop position 120GS2-022. If the storage conveyor 120E-005 is ready to receive bales, all bales at the same time will be forwarded from the de-wiring conveyor to the pulper feed conveyor. The speed of the receiving storage conveyor is adjusted to ensure that all bales fit to the available space.
Bales are forwarded only if the storage conveyor is empty and is not interlocked by the pulper feed conveyor.

When first bale has reached the storage conv limit switch 120GS2-023 the dewiring conveyor is considered empty and the conveyors will stop. The white lamp is switched off and a new set of bales of bales can be loaded for de-wiring.

Equipment

The function comprises the following devices:

- Bale limit switch for bale loading position, 120GS1-022
- Bale release sensor, 120GS-021
- Bale limit switch for bale stop position, 120GS2-022
- Limit switch for the lifting beam in lower position, 120GS1-024
- Pneumatic valve for control of the lifting beam up and down, 120HSV-024
- Pushbutton for de-wiring completion acknowledgement, 120HSI1-022
- Pushbutton 120HS1-024 and selector switch 120HS1-024A/B for control of the lifting beam up and down
- Conveyor motor, 120E-004-M1
- VFD for the pulper feed conveyor motor 120E-004-M1

3.2.3 Storage of bales on storage conveyor 120E-005

Function bale storage

The storage conveyor 120E-005 is receiving bales from the de-wiring conveyor 120E-004.

When the first bale in the set reaches the stop position 120GS2-023 the storage conveyor motor 120E-005-M1 will stop. The feeding from the de-wiring conveyor is then also stopped.

When the pulper feed conveyor is ready to receive bales the storage conveyor will feed all bales to the pulper feed conveyor.

When first bale has reached the feed conv limit switch 120GS2- the storage conveyor is considered empty and a new set of bales can be received from the de-wiring conveyor.

Equipment

The function comprises the following devices:

- Bale limit switch for bale inlet position, 120GS1-023
- Bale limit switch for bale stop position, 120GS2-023
- Motor, 120E-005-M1
- VFD for the pulper feed conveyor motor 120E-005-M1

3.2.4 Pulper feeding of bales by pulper feed conveyor 120E-006

Function Pulper feeding

The pulper feed conveyor 120E-006 is running in batch mode, feeding the pulper with bales.
One set of bales is received from the storage conveyor 120E-005. When the first bale in the batch reaches the stop position 120GS2-027 the pulper feed conveyor motor 120E-006-M1 will stop. The feeding from the storage conveyor is then also stopped.

When a second set of bales is ready on the storage conveyor the batch is complete and ready to be fed into the pulper. At this point the total weight of all bales standing on the storage conveyor 120E-005 and pulper feed conveyor 120E-006 is registered.

When the pulper is ready to receive bales (pulper interlock is deactivated) the pulper feeding sequence starts and the pulper feed conveyor will start feeding all bales into the pulper. This is done by running the pulper feed conveyors at a slow continuous speed.

When no bale has reached the photocell 120GS2-027 within a preset time [timer #5] the conveyor is considered empty and the next set of bales can be received from the storage conveyor. When the bales reach photocell 120GS2-027, the bales will be fed into the pulper at reduced conveyor speed and without delay.

The pulper feed sequence is now ended and a new batch can be de-wired.

Equipment

The function comprises the following devices:

- Bale limit switch for bale inlet position, 120GS2-027
- Bale photocell for bale stop position, 120GS2-027

- Motor, 120E-006-M1
- VFD for the pulper feed conveyor motor 120E-006-M1

3.2.5 Local controls

Conveyor controls from control desk 120CD-002

The local control desk 120CD-002 is equipped with local control switches for manual interaction with each of the conveyors. 120HS1-022 / 120HS1-023 and 120HS1-027 for operating mode selection, having LOCAL and REMOTE positions and 120HS2-022A/B / 120HS2-023A/B and 120HS2-027A/B for FORWARD and REVERSE operation, for each conveyor. In LOCAL mode it is not possible to run the de-wiring conveyor in reverse when bale limit switch 120GS1-022 is activated, the pulper feed conveyor cannot be run forward when bale photocell 120GS2-027 is activated.

Local control switches for de-wiring conveyor 120E-001

The bales are loaded onto the conveyor in REMOTE position. With 120HS1-002 in REMOTE position the pulping sequence (DCS) can start and stop the conveyor. In LOCAL position the operator can run the de-wiring conveyor locally forward and reverse by using switch 120HS2-002A/B, e.g. during failures when loading bales. When selecting LOCAL position from REMOTE position, the conveyor is stopped immediately. The operator selects the REMOTE position when the conveyor can be set back to automatic operation.

120HS1-023 / 120HS2-023A/B and 120HS1-027 / 120HS2-027A/B, local control switches for pulper feed conveyors 120E-005 and 120E-006.
Same function as for 120E-004

Lifting beam controls

See section 4.2.2

Emergency stop controls

See section 4.2.7

3.2.6 Indications

Indicator bank for the de wiring conveyor 120E-004

Function Loading of bales

The indicator bank located by the de-wiring conveyor is equipped with auditory and visual signals for operational guidance.

auditory signal, 120XI-035
Before start of production the alarm horn gives a 5 second signal to inform operators that production will start shortly. The controls should then be set to REMOTE mode and the pulper feed system should be loaded with bales.

visual signal, 120XI-037
A fixed green light is lit when the pulper feed system is running in REMOTE mode. This means that bale loading is allowed.

A flashing green light is lit when the de-wiring conveyor has received a full set of bales and de-wiring can be performed safely.

visual signal, 120XI-039
A fixed red light is lit when the conveyor 120E-004 is busy, i.e. the conveyor is running, the conveyor is set to LOCAL mode or that the production is stopped. This means that bale loading is forbidden.

3.2.7 Bale handling emergency stops

General functions

The emergency stop input functions 120HZ2-995, 120GZ7-995, 120GZ8-995…. 120GZ12-995 are used for immediate stopping of the pulper feed system including pulper rotor in case of emergency. All hazardous equipment in all lines shall be stopped from one emergency stop if several pulpers and pulper feed lines are present in same building.

The input functions are hardwired to a safety monitoring system (with relays or safety PLC) which will stop the pulping lines if any of the safety functions are activated.

The contact state of each of the emergency stop switches is wired to the safety monitoring system. The safety monitoring system can then forward the information to the DCS about which stop function that has been activated.

Emergency stop functions

If a safety function is activated, the safety relay initiates a shutdown of the contactor relay operation according to stop category 0 in compliance with EN 60204-1. This is done by switching off the control voltage to the contactor which will stop the motor circuit (hardwired and software interlock).

For the VFD controlled motors the Safe Torque Off (STO) function is used to stop the motor.

The emergency stop button does not affect the pneumatic valve on the de-wiring conveyor.

Emergency stop reset functions

If the safety relay has been activated, a reset of the safety relay must be done to restart the pulper feed system. This can be done with the illuminated push button 120HSI2-995A/B on the local control desk 120CD-002.

The relay monitors whether the contacts of the safety functions are closed, that all contactors are switched off and that the VFD has been brought to a stop with the following indications possible:

- Fixed blue light indicates that the emergency stop relay is possible to reset.
- Flashing blue light indicates that the safety relay is not possible to reset, i.e. that one or several emergencies stop functions still are active or that a fault has been detected.

Safety performance

The minimum required performance level for all safety functions is PL c according to ISO 13849-1.

Equipment

- The function comprises the following devices in the pulper feed system:
- Emergency stop button 120HZ2-995 with 3N/C contacts
- Emergency stop rope pull switch GZ7 and GZ8-995 with 3N/C contacts, located along the de-wiring conveyor chain beam
- Emergency stop rope pull switch GZ9 and GZ10-995 with 3N/C contacts, located along the storage conveyor chain beam
- Emergency stop rope pull switch GZ11 and GZ12-995 with 3N/C contacts, located along the pulper feed conveyor vat
- Emergency stop local acknowledge push button with indication light, 120HSI2-995A/B
- Emergency stop relay (located in MCC)
- VFD for motor 120E-004-M1

- VFD for motor 120E-005-M1
- VFD for motor 120E-006-M1
- Motor contactors for the pulper rotor

Other equipment or functions connected to the E-stop group according to valid risk assessment

User interface

The status information of each of the emergency stop buttons and relays (=E-stop group) are shown on the DCS display. The emergency stop can be activated only from the field by using the emergency stop button or rope pull switches. The emergency stop can be acknowledged only from the field after each of the individual emergency stop switches are in healthy condition.

The control desk 120CD-002 shall be installed at a safe place with good visibility over the control zone to ensure that no-one is in hazardous position during operation.

4 REFERENCES TO OTHER DOCUMENTS

Documents that are referred to in this document is presented in Table 6

Table 6 References to other documents

Document	Document no.
Process Flow sheet	KSDM160095102
Safety of machinery - Electrical equipment of machines - Part 1: General requirements	IEC 60204-1
Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	EN ISO 13849-1

5 Revision history
The revision history for the document is presented in the table below.

Table 7 Revision history

Rev	Change information	Introduced	Signature
01			
02			
03			
0			

5 FUNCTIONS AND INTERLOCKS FOR THE BALE HANDLING

5.1.1 Definition of Terms

Loop and Valve Number

Loop identification number.

Process Function

A brief description of the loop operation

Point of Control

Whether DCS or local control.

Graphic Display

Title of graphic display

Permissive

A signal required that allows the equipment to be started. Once the equipment is in operation it will continue to operate even if the permissive signal is lost. This signal is required in all control modes unless stated otherwise.

Interlocks

A signal required to start and to continue to operate equipment. Without the interlock signal the equipment will not operate. The equipment will stop operating if it is operating when the signal is lost. This signal is required in all control modes unless stated otherwise.

Manual Mode

Description of manual operation requirements. The equipment must be selected in MANUAL for this operation.

Auto Mode

Description of automatic operation requirements. The equipment must be selected in AUTOMATIC for this operation.

Remote Function

Description of cascade operation requirements or when controlled by a remotely

calculated set point. The equipment must be selected in REMOTE for this operation.

Indication

Definition of device status indications and location of indications.

Interlock limits

Definition of interlock requirements.

Alarms

Definition of alarm requirements

5.1.2 De-wiring conveyor 120E-004

Motor Number

120E-004M1

Process Function

The bales are being de wired on the conveyor before going to storage convey0r. The conveyors can run in forward and reverse mode: reverse mode is not accessible from DCS station.

Point of Control

DCS and Local operation

Graphic Display

Bale Handling System graphic, X.X

Permissive's

None

Interlocks

The conveyor will stop/cannot start:

-Lifting beam 120HS-024 is in upper position.

-The de-wiring conveyor cannot be run backwards if Local/Remote switch 120HS1-022 is in LOCAL AND control switch Forward/Reverse 120HS2-022 is selected in reverse AND bale limit switch 120GS1-022 is activated.

-The 120GS2-022 is activated, and storage conveyor not running.

-Emergency stop 120HZ-995 tripped, all e stops buttons and pull rope switches

Local Mode

The conveyor can be run in forward and reverse by the operator at the conveyor, local panel by switch 120HS2-022

Manual Mode

No DCS only manual mode

Auto Mode

The conveyer is started, in forward mode only, and by switch 120GS1-022 active

and fork lift presence sensor 120GS1-001 not activated.

The conveyor will run for xx seconds then stop as a part of conveyor loading operation.

The conveyor will also be a part of the conveyor transfer sequence.

Indication

Standard motor display.

5.1.3 Storage conveyor 120E-005

Motor Number

120E-005M1

Process Function

A set of bales is received from the de-wiring conveyor 120E-004. If the pulper feed conveyor 120E-006 is ready to receive bales, all bales at the time will be forwarded from the storage conveyor to the pulper feed conveyor.

Point of Control

Local and remote operation

Graphic Display

Bale Handling System graphic, X.X

Interlocks

The conveyor will stop cannot start:

-The de wiring conveyor cannot be run backwards if Local/Remote switch 120HS1-023 is in LOCAL AND control switch Forward/Reverse 120HS2-023 is selected in reverse AND bale limit switch 120GS1-022 is activated.

-The 120GS2-023 is activated, and storage conveyor not running.

-Emergency stop 120HZ-995 tripped, all e stops buttons and pull rope switches

Local Mode

The conveyor can be run in forward and in reverse by the operator at the conveyor, local panel with switch 120HS2-023

Manual Mode

No DCS only manual mode

Auto Mode

The conveyor will start and stop in the conveyor sequence.

Indication

Standard motor display.

5.1.4 Pulper feed conveyor 120E-006

Motor Number

120E-006M1

Process Function

The conveyor transports bales from the storage conveyer to the bale pulper 121E-001.

Point of Control

Local and remote operation

Graphic Display

Bale Handling System graphic, X.X

Interlocks

The conveyer will stop cannot start:

-The pulper feed conveyor cannot be run backwards if Local/Remote switch 120HS1-027 is in LOCAL AND control switch Forward/Reverse 120HS2-027 is selected in reverse AND bale limit switch 120GS1-027 is activated.

-Emergency stop 120HZ-995 tripped, all e stops buttons and pull rope switches

- The pulper feed conveyor cannot be run forward if pulper level 121LI-001 not OK and bale limit switch GS2-027 is activated.

Local Mode

The conveyor can be run in forward and in reverse by the operator at the conveyor, local panel with switch 120HS2-027

Manual Mode

No DCS manual mode

Auto Mode

The conveyor will start and stop in the storage conveyor sequence and bale pulper sequence.

Indication

Standard motor display.

5.1.5 Bale release sensor - 120GS-021

Loop Number

120GS-021 - DI

Process Function

A bale release sensor 120GS-021 prevents the de wiring conveyor from starting if the stack is not lifted.

Point of Indication

No indication

Graphic Display

No System graphic

Indication

Green when activated

5.1.6 De-wiring conveyor Bale loading position at inlet end 120GS1-022

Loop Number

120GS1-022 - DI

Process Function

The switch is activated when a bale is placed on the de wiring conveyor at the loading zone,

Point of Control

The signal is activated when the bale is placed on top of the switch

Graphic Display

No graphic,

Indication

Green when activated

5.1.7 De-wiring conveyor Bale loading position at outlet end - 120GS2-022

Loop Number

120GS2-022

Process Function

The loop indicates when the de wiring conveyor is full. When the first bale reaches the switch the de wiring conveyor 120E-004-M1 stops and it is not possible to put on more bales.

Point of Control

The signal is activated when the bale is on top of the switch

Graphic Display

Bale Handling System graphic, X.X

Indication

Green when activated

5.1.8 De-wiring conveyor remote/local selector switch – 120HS1-022A and 120HS1-022B

Loop Number

120HS1-022A – DI

120HS1-022B - DI

Process Function

The de-wiring desk remote/local switch allows the operator to change the state of the de wiring conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-004 Remote mode

Selector Switch position left, conveyor 120E-004 Local mode

Point of control

Control desk CD002, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS”DE-WIRING IN LOCAL”

5.1.9 De-wiring conveyer forward / reverse selector switch 120HS2-022A/B

Loop Number

120HS2-022A -DI

120HS2-022B -DI

Process Function

The de-wiring conveyor “forward” selector allows the operator at the control desk 120CD-002 to drive the de-wiring conveyor forward: the de-wiring conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-022.

The de-wiring conveyor “reverse” selector allows the operator at the control desk 120CD-002 to drive the de-wiring conveyor in reverse: the de-wiring conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS1-022.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-022B.

Selector Switch position right, Conveyor 120E-004 Forward

Selector Switch position left, Conveyor 120E-004 Reverse

Point of Control

De-wiring/pulp conveyor control desk 120CD-002

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.10 De wiring complete HW illuminated push button 120HSI2-022A/B

Loop Number

120HSI2-022A – DI - Button

120HSI2-022B – DI - Light

Process Function

The de-wiring complete button is activated by the operator when all bales of HW are loaded and de wired on the conveyor. The push button will flash for 5 seconds and the operator needs to confirm selection by pushing the button once more with in this time. The light will illuminate solid and the signal will indicate in the DCS that the batch is ready to be fed on to the pulp conveyor by the conveyor sequence.

Point of Control

De-wiring/pulp conveyor control desk 120CD-002

Graphic Display

Bale handling system graphic 1.1

Indication

“De-wiring complete” is shown

5.1.11 Storage conveyor at inlet end 120GS1-023

Loop Number

120GS1-023 - DI

Process Function

The switch is activated when a bale is passing

Point of Control

The signal is activated when the bale is placed on top of the switch

Graphic Display

No graphic,

Indication

Green when activated

5.1.12 Storage conveyer Bale loading position at outlet end - 120GS2-023

Loop Number

120GS2-023

Process Function

The loop indicates when the storage conveyor is full. When the first bale reaches the switch the storage conveyor 120E-005-M1 stops and it is not possible to put on more bales.

Point of Control

The signal is activated when the bale is on top of the switch

Graphic Display

Bale Handling System graphic, X.X

Indication

Green when activated

5.1.13 Storage conveyor remote/local selector switch – 120HS1-023A and 120HS1-023B

Loop Number

120HS1-023A – DI

120HS1-023B - DI

Process Function

The control desk CD002 remote/local switch allows the operator to change the state of the storage conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-005 Remote mode

Selector Switch position left, conveyor 120E-005 Local mode

Point of control

Control desk CD002, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS ”STORAGE IN LOCAL”

5.1.14 Storage conveyer forward / reverse selector switch 120HS2-023A/ 120HS2-003B

Loop Number

120HS2-023A -DI

120HS2-023B -DI

Process Function

The storage conveyor “forward” selector allows the operator at the control desk 120CD-002 to drive the storage conveyor forward: the storage conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-023.

The storage conveyor “reverse” selector allows the operator at the control desk 120CD-002 to drive the storage conveyor in reverse: the storage conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS1-023.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-023B.

Selector Switch position right, Conveyor 120E-005 Forward

Selector Switch position left, Conveyor 120E-005 Reverse

Point of Control

Control desk 120CD-002

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.15 Lifting beam selector switch 120HS1-024A/B

Loop Number

120HS1-024A - DI

Process Function

The de-wiring conveyor lifting beam selector switch 120HS1-024A/B allows the operator at the control desk 120CD-002 to raise and lower the beam. The selector switch is activating solenoid valve 120HSV1-024A(up)and 120HSV1-024B(down). This button operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-022B.

Selector Switch position right, lifting beam up

Selector Switch position left, lifting beam down

Point of Control

De-wiring/pulp conveyor control desk 120CD-002

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.16 Lifting beam up 120HSV1-024A

Loop Number

120HSV1-024A

Process Function

The lifting beam up solenoid valve is used to raise the de-wiring beam to upper position so the operator can de-wire the bales easier.

Point of control

Only local control at 12OCD-002

Point of Indication

No local indication

Graphic Display

No System graphic,

Indication

Standard indication

5.1.17 Lifting beam down 120HSV1-024B

Loop Number

120HSV1-024B

Process Function

The lifting beam down solenoid valve is used to lower the de-wiring beam to lower position after the operator have de-wire the bales.

Point of control

Only local control at 12OCD-002

Point of Indication

No local indication

Graphic Display

No System graphic,

Indication

Standard indication

5.1.18 Pulper feed conveyor Reverse interlock sensor 120GS1-027

Loop Number

120GS1-027 - DI

Process Function

The pulper feed conveyor cannot be run backwards if LOCAL control 120HS-027 is selected AND reverse interlocking sensor 120GS1-027 is activated, this is to prevent bales reversing onto the storage conveyor when the pulper feed conveyor is in reverse.

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, xx

Indication

Green when activated

5.1.19 Pulper feed conveyor loaded switch 120GS2-027

Loop Number

120GS2-027 - DI

Process Function

The loop indicates if any bales are at the top of the pulper feed conveyor. When the first bale reaches the switch the pulper feed conveyor 120E-006M1 stops.

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, xx

Indication

Green when activated

5.1.20 Pulper feed conveyor remote/local switch – 120HS1-027A/120HS1-027B

Loop Number

120HS1-027A – DI

120HS1-027B - DI

Process Function

The conveyor control desk CD002 remote/local switch allows the operator to change the state of the pulper feed conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-006 Remote mode

Selector Switch position left, conveyor 120E-006 Local mode

Point of control

Control desk 120CD-002, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS ”LOADING IN LOCAL”

5.1.21 Pulper feed conveyer forward / reverse switch 120HS2-027A/120HS2-027B

Loop Number

120HS2-027A -DI

120HS2-027B -DI

Process Function

The pulper feed conveyor “forward” selector allows the operator at the control desk 120CD-002 to drive the pulper feed conveyor forward: the pulper feed conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-027.

The pulper feed conveyor “reverse” selector allows the operator at the control desk 120CD-002 to drive the feed conveyor in reverse: the feed conveyor will run as long the signal is maintained providing it is not stopped by an interlock (see 6.1.4) or switch 120GS1-027.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-027B.

Selector Switch position right, Conveyor 120E-006 Forward

Selector Switch position left, Conveyor 120E-006 Reverse

Point of Control

De-wiring/pulp conveyor control desk 120CD-002

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.22 Audio alarm “pre-warning conveyors start” – 120XI-035

Loop Number

120XI-035 - DO

Process Function

Before start of conveyor movement, the alarm horn gives a 5 second signal to inform operators that movement will start shortly. The controls should be set to REMOTE mode and the pulper feed system should be loaded with bales. This is a part of conveyor sequence.

Point of control

No control in DCS

Graphic Display

No display

Indication

No indication

5.1.23 Load SW de-wiring conveyor 120XI-037

Loop Number

120XI-037 - DO

Process Function

A fixed blue light is lit when the pulper feed system is running in REMOTE mode and hardwood bale loading is allowed.

A flashing blue light is lit when the de wiring conveyor has received a full batch of bales and de wiring can be performed safely

Point of control

No control in DCS

Graphic Display

No display

Indication

No indication

5.1.24 Light indicator “Conv. Busy”120XI-039

Loop Number

120XI-039 - DO

Process Function

A fixed red light is illuminated when the conveyor 120E-005 is busy, i.e. the conveyor is running, the conveyor is set to LOCAL mode or that the production is stopped. This means that bale loading is forbidden if:

- Transferring sequence ongoing conveyor 120E-004
- Transferring sequence ongoing conveyor 120E-005

Point of control

No control in DCS

Graphic Display

NA

Indication

NA

5.1.25 Weighing system – 120WI-030

Loop Number

120WI-030 – No I/O

Process Function

The loop collects data from eight weight cells on the pulper feed conveyor the weight of the bales used for calculating the correct amount of water to be added in the pulper.

The weighing system with eight weigh modules (load cells) is shown in Figure 3 and described in Table 3.

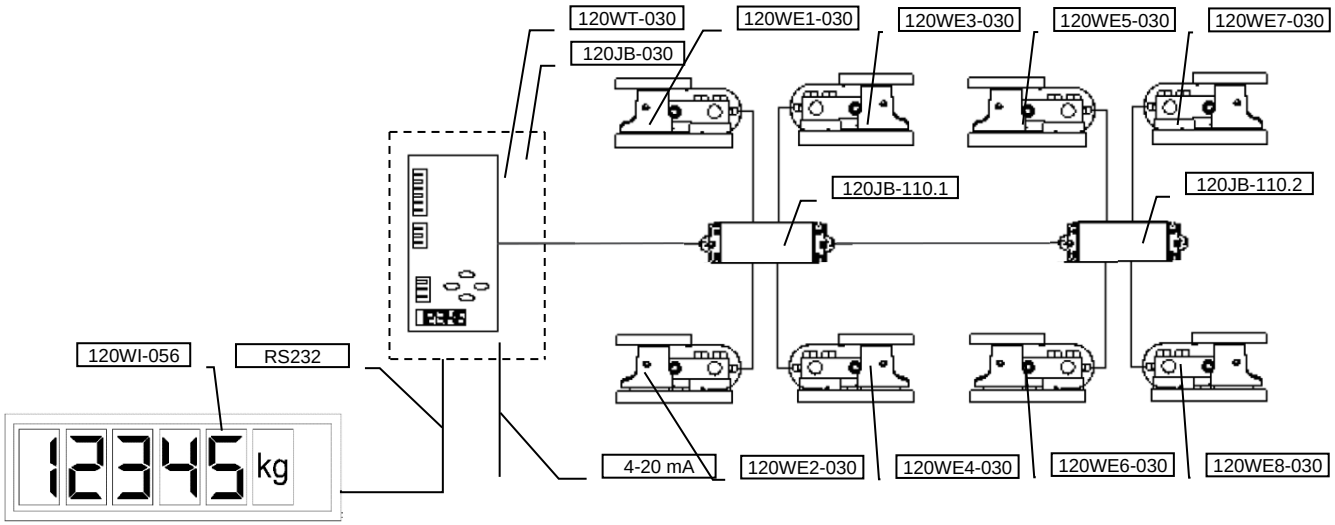


Figure 6 Weighing system with eight load cells

Table 3 Description of the weighing system

Standard Item/Tag	Customer Item/Tag	Device	Function
120WI-030		External display	Large display to visualize the loaded weight for the operator
120WT-030		Weighing terminal	Weighing terminal with weight indication
120JB-030		Junction box	Junction box for the weighing terminal
120JB-030.1		Load cell junction box #1	Precision junction box for multiple load cell connection

120JB-030.2		Load cell junction box #2	Precision junction box for multiple load cell connection
120WE1-030		Load cell #1	Load cell for weight registration
120WE2-030		Load cell #2	Load cell for weight registration
120WE3-030		Load cell #3	Load cell for weight registration
120WE4-030		Load cell #4	Load cell for weight registration
120WE5-030		Load cell #5	Load cell for weight registration
120WE6-030		Load cell #6	Load cell for weight registration
120WE7-030		Load cell #7	Load cell for weight registration
120WE8-030		Load cell #8	Load cell for weight registration

Point of Indication

External local display

Graphic Display

In DCS

Indication

Total weight is showed

5.1.26 Conveyor system control desk 120CD-002

Desk Number

120CD-002

Process Function

To enable operation of the de wiring and pulp conveyor locally

Point of Control

DCs and Local operation

Graphic Display

No display

Local Mode

The de-wiring and pulp conveyor can be operated locally by the operator.

de-wiring and loading

In auto mode the DCS takes over control. The de-wiring and pulp conveyor are controlled by the conveyor sequence.

Indication

NA

5.1.27 Emergency stop bale handling 120HZ2-995

Loop Number

120HZ2-995A

Process Function

Mush room button in control desk CD002

Emergency stop for bale handling system.

When emergency stop is activated at the control desk following will stop

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-006-M1
- Storage conveyor 120E-005-M1
- De-wiring conveyor 120E-004-M1

Reset of emergency stop at local control desk 120CD-002 120HSI2-995A

Point of Control

Mush room button in control desk CD001

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.28 De-wiring conveyor rope pull safety switch 120GZ7,8-995

Loop Number

120G7,8-995 DIZ

Process Function

A safety rope is mounted on the side of de wiring conveyor, if this is pulled and switch 120GZ7,8-995 is activated the emergency stop will be activated and following will be stopped

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-006-M1
- Storage conveyor 120E-005-M1
- De-wiring conveyor 120E-004-M1

Reset of emergency stop at local control desk 120CD-002 120HSI2-995A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.29 Pulper feed conveyor rope pull safety switch 120GZ9,10-995

Loop Number

120GZ9,10-995 DIZ

Process Function

A safety rope is mounted in the roof of the pulper feed conveyor canape, if this is pulled and switch 120GZ9,10-995 is activated the emergency stop will be activated, and following will be stopped

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-006-M1
- Storage conveyor 120E-005-M1
- De-wiring conveyor 120E-004-M1

Reset of emergency stop at local control desk 120CD-002 120HSI2-995A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.30 Pulper feed conveyor rope pull safety switch 120GZ11,12-995

Loop Number

120GZ11,12-995 DIZ

Process Function

A safety rope is mounted in the roof of the pulper feed conveyor canape, if this is pulled and switch 120GZ11,12-995 is activated the emergency stop will be activated, and following will be stopped

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-006-M1
- Storage conveyor 120E-005-M1
- De-wiring conveyor 120E-004-M1

Reset of emergency stop at local control desk 120CD-002 120HSI2-995A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.31 Emergency stop reset illuminated push button 120HSI2-995A/B

Loop Number

120HSI2-995A – DI - reset

120HHS2-995B – DO – light for emergency stop tripped

Process Function

- If the safety relay has been activated, a reset of the safety relay must be done to restart the pulper feed system. This can be done with the illuminated push button HSI2-995A on the local control desk 120CD-002.
- Fixed blue light indicates that the emergency stop relay is possible to reset

Point of Control

Control desk 120CD-002

Graphic Display

Bale handling system graphic 1.1

Indication

Blue light in control desk is shown

5.2 CONVEYOR SEQUENCE

Note that all interlocks are valid all times and will override any Sequence logic where applicable.

Note that the Sequence logic is valid only whilst the Sequence is active but will override any other logic (with exception of interlocks) during that time where applicable.

The start sequence for the conveyor system consist of three types of transferring sequences

1. De wiring to storage
2. Storage to loading
3. Loading sequence for pulper

The concept for starting the sequences is that then system is in auto the conveyor will start if the next conveyor is empty.

First batch

- Load de-wiring conveyor and de wire
- The operator now pushes “de-wiring complete” 120HSI1-022 on control desk CD002.

  Now the sequence is ready to start

Sequence permissive

Before being available for selection, the sequence requires the following conditions to be met:

- De-wiring conveyor 120E-004 M1 in Remote

- Storage conveyor 120E-005 M1 in Remote
- Pulper feed conveyor 120E-006 M1 in Remote
- Signal from “De-wiring complete” activated

5.2.1 Start sequence 1

Bales on de-wiring conveyor to be moved to end of storage conveyor

Sequence will start if 120GS2-023 bales position in outlet end storage conveyor not activated.

Step 1. START SEQUENCE 1

- Pre-warning conveyors start, audible alarm 120XI-035 activates for 5 sec before conveyors start- Timer T4

Before going to next step, the sequence checks following conditions are met:

- End of Timer T4 120XI-035 go off

Step 2. START CONVEYORS

- Start de-wiring conveyor 120E-004M1
- Start storage conveyor 120E-005M1
- Activate visual signal 120XI-039 conveyor system busy

Now one batch transferred from de wiring conveyor on to the storage conveyor

Before going to next step, the sequence checks following conditions are met:

- De-wiring conveyor 120E-004M1 - RUN
- Storage conveyor 120E-005M1- RUN

Step 3. STOP PRE-WARNING

Before going to next step, the sequence checks following conditions are met:

- Storage conveyor bale loaded in outlet end switch 120GS2-023 to be activated.

Step 4. STOP CONVEYORS

- Stop de-wiring conveyor 120E-004M1
- Stop storage conveyor 120E-005M1
- Indication light 120XI-039 go off

Before going to step 1 the sequence checks following conditions are met:

- De-wiring conveyor 120E-004M1 - Stop
- Storage conveyor 120E-005M1- Stop

One batch is now waiting to be feed over to the pulper feed conveyor, now the operator can load and de wire a new batch.

5.2.2 Start sequence 2

Bales from storage conveyor to be moved to pulper feed conveyor.

Sequence will start if 120GS2-027 not activated by bales in upper position.

Step 1. START SEQUENCE 2

- Pre warning conveyors start, audible alarm 120XI-035 activates for 5 sec before conveyors start- Timer T1

Before going to next step, the sequence checks following conditions are met:

- End of Timer T1 120ZXI-035 go off

Step 2. START CONVEYORS

- Start storage conveyor 120E-005M1
- Start pulper feed conveyor 120E-006M1
- Activate visual signal 120XI-039 conveyor system busy

Now one batch is going of the storage and up on the pulper feed conveyor

Before going to next step, the sequence checks following conditions are met:

- Storage conveyor 120E-005M1 - RUN
- Pulper feed conveyor 120E-006M1- RUN

Step 3. STOP PRE-WARNING

Before going to next step, the sequence checks following conditions are met:

- Pulper feed conveyor bale loaded in outlet end switch 120GS2-027 to be activated.

Step 4. STOP CONVEYORS

- Stop storage conveyor 120E-005M1
- Stop pulper feed conveyor 120E-006M1
- Indication light 120XI-039 go off

Before going to step 1 the sequence checks following conditions are met:

- Storage conveyor 120E-005M1 - Stop
- Pulper feed conveyor 120E-006M1- Stop

5.2.3 Start sequence 3

Bales on pulper feed conveyor to be entering the pulper

Sequence 3 will start when signal is activated from pulper sequence

This will be a part of the pulper sequence.

1.1 BALE HANDLING JUPITER HW LINE

						APPROVALS		
Issue	**Date**	**Pages**	**Issue Description**			**By**	**Check**	**Approve**
00	20-09-17		Preliminary			NOM	FKC	
■	Entire Specification Issued this Revision		SPECIFICATION ISSUED FOR:					
			■	Review		☐	Purchase	
☐	Revised Pages Only Issued this Revision		☐	Client Approval		☐	Construction	
			☐	Enquiry		☐		

TABLE OF CONTENTS

1 PURPOSE OF THE FUNCTIONAL DESCRIPTION 1
2 GENERAL 1
3 FUNCTIONAL DESCRIPTION 3
3.1 **GENERAL** 3
3.1.1 Main equipment 3
3.1.2 Electrical equipment and components 4
3.1.3 Weighing system 6
3.1.4 Local controls 7
3.1.5 Indications 9
3.2 **FUNCTIONAL DESCRIPTION OF THE PULPER FEED SYSTEM** 10
3.2.1 General 10
3.2.2 Bale loading and de wiring of bales on de wiring conveyor 120E-104 10
3.2.3 Storage of bales on storage conveyor 120E-105 13
3.2.4 Pulper feeding of bales by pulper feed conveyor 120E-106 14
3.2.5 Local controls 16
3.2.6 Indications 17
3.2.7 Bale handling emergency stops 18
4 REFERENCES TO OTHER DOCUMENTS 21
5 FUNCTIONS AND INTERLOCKS FOR THE BALE HANDLING 22
5.1.1 Definition of Terms 22
5.1.2 De-wiring conveyor 120E-104 24
5.1.3 Storage conveyor 120E-105 26
5.1.4 Pulper feed conveyor 120E-106 27
5.1.5 Bale release sensor - 120GS-121 28
5.1.6 De-wiring conveyor Bale loading position at inlet end 120GS1-122 29
5.1.7 De-wiring conveyor Bale loading position at outlet end - 120GS2-122 30
5.1.8 De-wiring conveyor remote/local selector switch – 120HS1-122A and 120HS1-122B 31
5.1.9 De-wiring conveyer forward / reverse selector switch 120HS2-122A/B 32
5.1.10 De wiring complete HW illuminated push button 120HSI2-122A/B 33
5.1.11 Storage conveyor at inlet end 120GS1-123 34
5.1.12 Storage conveyer Bale loading position at outlet end - 120GS2-123 35
5.1.13 Storage conveyor remote/local selector switch – 120HS1-123A and 120HS1-123B 36
5.1.14 Storage conveyer forward / reverse selector switch 120HS2-123A/ 120HS2-123B 37
5.1.15 Lifting beam selector switch 120HS1-124A/B 38
5.1.16 Lifting beam up 120HSV1-124A 39
5.1.17 Lifting beam down 120HSV1-124B 40
5.1.18 Pulper feed conveyor Reverse interlock sensor 120GS1-127 41
5.1.19 Pulper feed conveyor loaded switch 120GS2-127 42
5.1.20 Pulper feed conveyor remote/local switch – 120HS1-127A/120HS1-127B 43
5.1.21 Pulper feed conveyer forward / reverse switch 120HS2-127A/120HS2-127B 44
5.1.22 Audio alarm "pre-warning conveyors start" – 120XI-135 45
5.1.23 Load HW de-wiring conveyor A 120XI-137 46
6.1.25 Light indicator "Conv. Busy"120XI-139 47
5.1.24 Weighing system – 120WI-130 48
5.1.25 Conveyor system control desk 120CD-004 50
5.1.26 Emergency stop bale handling 120HZ2-996 52
5.1.27 De wiring conveyor rope pull safety switch 120GZ7,8-996 53

5.1.28 Pulper feed conveyor rope pull safety switch 120GZ9,10-996 54
5.1.29 Pulper feed conveyor rope pull safety switch 120GZ11,12-996 55
5.1.30 Emergency stop reset illuminated push button 120HSI2-996A/B 56
5.2 CONVEYOR SEQUENCE 57
5.2.1 Start sequence 1 58
5.2.2 Start sequence 2 60
5.2.3 Start sequence 3 62

1 PURPOSE OF THE FUNCTIONAL DESCRIPTION

The purpose of this document is to give a general view of the function of the equipment included in the delivery from Valmet.

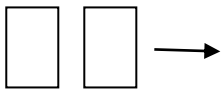
The functional description is to be used by electrical designers, programmers of the automation system as well as process operators.

Only process functions and interlocks are described in this function description. Basic MCC interlocks, MCC faults, measurement faults, valve position monitoring and other common standard functions that are applied to all zones are not described in this function description. Only if exceptions are needed, they will be mentioned case by case in this description.

2 GENERAL

The bale handling system brings virgin pulp bales from the pulp yard to the pulper for slushing in a batch sequence. The system consists of a de-wiring conveyor of type MDB, a storage conveyor and a pulper feed conveyor of type CHB-FD.

The bales are loaded as stacks of bales by a forklift truck. The bales are oriented with the long side in the conveyor transport direction.



De stacking is done on the de-wiring conveyor by the forklift operator following the signals on the indicator bank. As many bales as required in the batch are loaded onto the conveyor. The de-wiring conveyor cannot take the whole batch so the de-wiring must be done in two sequences.

When the first set of bales have been loaded the operator lifts all bales with a lifting beam integrated in the conveyor. The bale wires are then manually cut and removed by hand.
A second set of bales are thereafter loaded and de-wired. When de-wiring is completed the operator lowers the bales onto the conveyor chains and acknowledges the completion of the de-wiring sequence. The bales then continue to the intermediate storage conveyor.

The final batch of bales standing on the pulper feed conveyor and the storage conveyor is weighed all together and brought to the pulper inlet chute for slushing.

3 FUNCTIONAL DESCRIPTION

3.1 GENERAL

3.1.1 Main equipment

Main equipment included in the pulper feed system are shown in Figure 1 and described in Table 1.

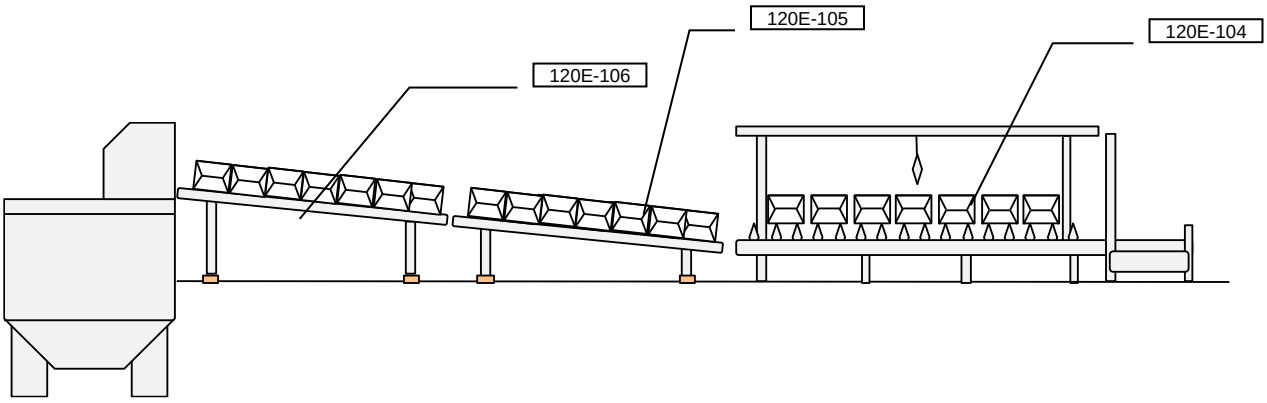


Figure 1 Main equipment included in the pulper feed system

Table 1 Description of main equipment in the pulper feed system

Standard Item/Tag	Function	Description
120E-104	De-wiring of bales	Manual de-wiring conveyor, type MDB3015H07-L Conveying speed 0.1 - 0.3 m/s (VFD)
120E-105	Intermediate storage of bales	Storage conveyor, type CHB370-FD Conveying speed 0.1 - 0.3 m/s (VFD)
120E-106	Pulper feeding of bales	Storage conveyor, type CHB370-FD Conveying speed 0.1 - 0.3 m/s (VFD)

3.1.2 Electrical equipment and components

Electrical equipment and components are shown in Figure 2 and described in Table 2.

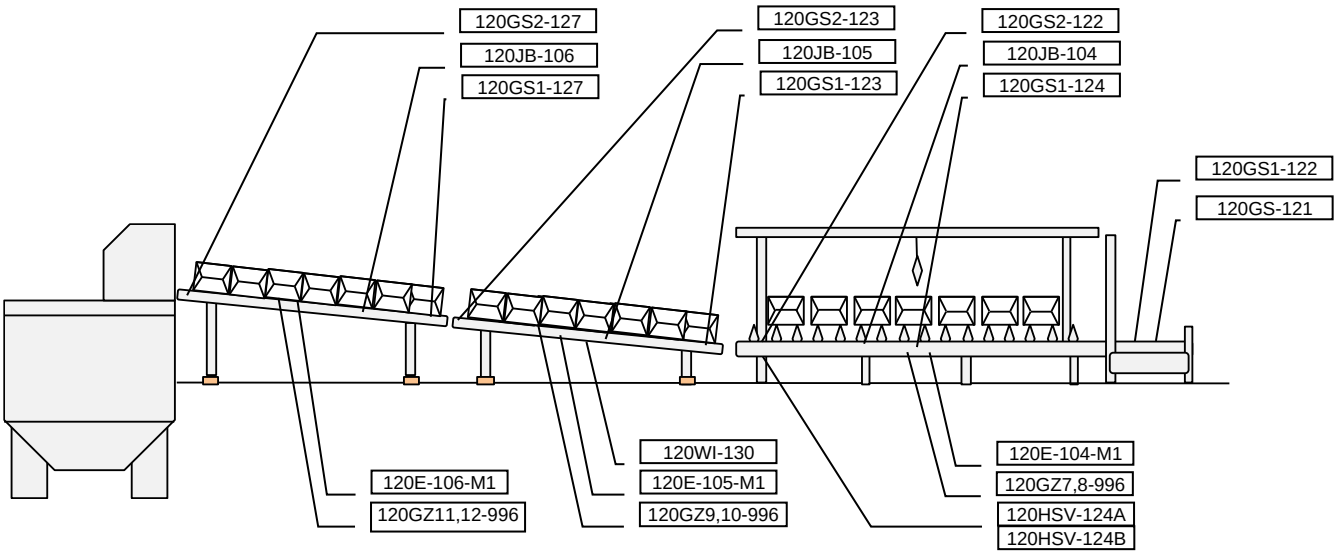


Figure 2 Electrical equipment and components included in the pulper feed system

Table 2 Description of electrical components included in the pulper feed system

Item/Tag	Device	Function
120E-104-M1	Motor	Electrical gear motor for de-wiring conveyor
120JB-104	Junction box	Junction box for conveyor
120GS-121	Photocell	Bale release sensor
120GS1-122	Limit switch	Bale loading position at inlet end
120GS2-122	Limit switch	Bale stop position at outlet end
120GS1-124	Limit switch	Lifting beam in lower position
120HSV-124A	Pneumatic valve – coil 14	Lifting beam up
120HSV-124B	Pneumatic valve – coil 12	Lifting beam down
120GZ7,8-996	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120E-105-M1	Motor with brake	Electrical gear motor with brake for storage conveyor

Item/Tag	Device	Function
120JB-104	Junction box	Junction box for conveyor
120GS1-123	Limit switch	Bale loading position at inlet end
120GS2-123	Limit switch	Bale stop position at outlet end
120GZ9,10-996	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120GS1-127	Limit switch	Bale loading position at inlet end
120GS2-127	Photocell	Bale stop position at outlet end
120GZ11,12-996	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120E-106-M1	Motor with brake	Electrical gear motor with brake for storage conveyor
120JB-106	Junction box	Junction box for conveyor
120WI-130	Weighing system	Batch weight

3.1.3 Weighing system

The weighing system is shown in Figure 3 and described in Table 3.

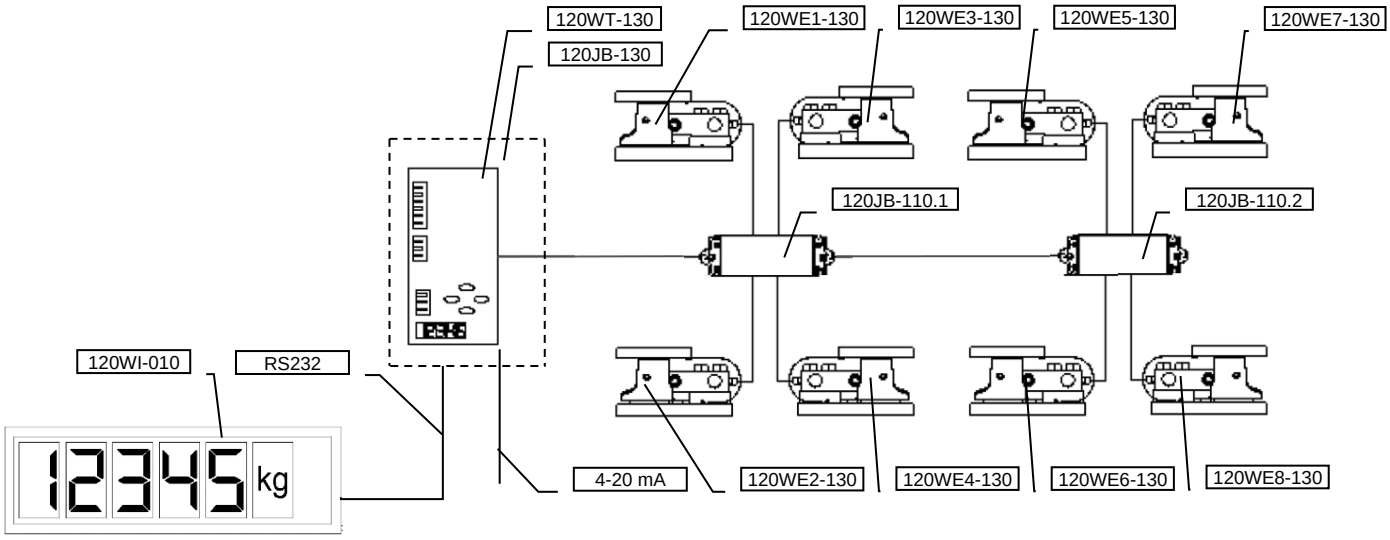


Figure 3 Weighing system with six load cells

Table 3 Description of the weighing system

Customer Item/Tag	Device	Function
120WI-130	External display	Large display to visualize the loaded weight for the operator
120WT-130	Weighing terminal	Weighing terminal with weight indication
120JB-130	Junction box	Junction box for the weighing terminal
120JB-130.1	Load cell junction box #1	Precision junction box for multiple load cell connection
120JB-130.2	Load cell junction box #2	Precision junction box for multiple load cell connection
120WE1-130	Load cell #1	Load cell for weight registration
120WE2-130	Load cell #2	Load cell for weight registration
120WE3-130	Load cell #3	Load cell for weight registration
120WE4-130	Load cell #4	Load cell for weight registration
120WE5-130	Load cell #5	Load cell for weight registration
120WE6-130	Load cell #6	Load cell for weight registration
120WE7-130	Load cell #7	Load cell for weight registration
120WE8-130	Load cell #8	Load cell for weight registration

3.1.4 Local controls

Local controls are shown in Figure 4 and described in Table 4.

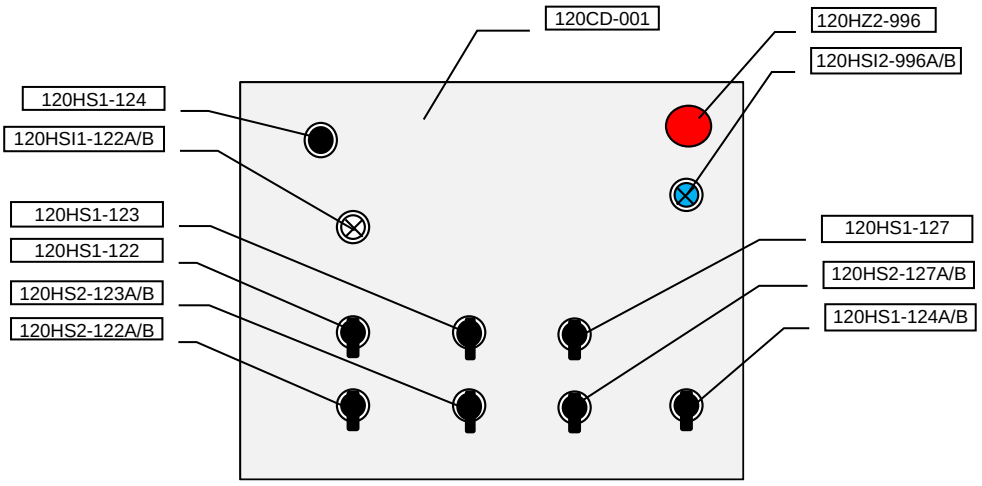


Figure 4 Local controls in the pulper feed system

Table 4 Description of electrical components for control of the pulper feed system

Customer Item/Tag	Device	Function	Color
120CD-004	Control desk	Local control desk for the pulper feed system	-
120HZ2-996	Mushroom push button	Emergency stop	Red
120HSI2-996	Illuminated push button	Emergency stop reset	-
120HSI2-996A	Push button	Reset function	-
120HSI2-996B	Indication lamp	Emergency stop tripped	Blue
120HSI1-122	Illuminated push button	De-wiring completed	-
120HSI1-122A	Push button	De-wiring completed	-
120HSI1-122B	Indication lamp	De-wiring completed acknowledgement	White
120HS1-124	Push button	Hold to run	White
120HS1-124A	Selector Switch position right	Lifting beam up	-
120HS1-124B	Selector Switch position left	Lifting beam down	-

Table continued on next page

Table 4 Continuation from previous page

Customer Item/Tag	Device	Function	
120HS1-122	Selector Switch	Conveyor 120E-004 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-004 Remote mode	-
-	Selector Switch position left	Conveyor 120E-004 Local mode	-
120HS2-122	Selector Switch	Conveyor 120E-004 Forward/0/Reverse operation	Black
120HS2-122A	Selector Switch position right	Conveyor 120E-004 Forward	-
120HS2-122B	Selector Switch position left	Conveyor 120E-004 Reverse	-
120HS1-123	Selector Switch	Conveyor 120E-005 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-005 Remote mode	-
-	Selector Switch position left	Conveyor 120E-005 Local mode	-
120HS2-123	Selector Switch	Conveyor 120E-005 Forward/Reverse operation	Black
120HS2-123A	Selector Switch position right	Conveyor 120E-005 Forward	-
120HS2-123B	Selector Switch position left	Conveyor 120E-005 Reverse	-
120HS1-127	Selector Switch	Conveyor 120E-006 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-006 Remote mode	-
-	Selector Switch position left	Conveyor 120E-006 Local mode	-
120HS2-127	Selector Switch	Conveyor 120E-006 Forward/Reverse operation	Black
120HS2-127A	Selector Switch position right	Conveyor 120E-006 Forward	-
120HS2-127B	Selector Switch position left	Conveyor 120E-006 Reverse	-

3.1.5 Indications

Indications are shown in Figure 5 and described in Table 5.

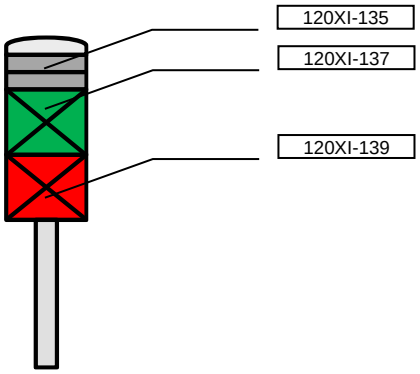


Figure 5 Indicator bank for the de-wiring conveyor

Table 5 Description of the indicator bank for the de-wiring conveyor

Customer Item/Tag	Device	Description	Color
120XI-135	Alarm horn	Auditory signal PRODUCTION START	-
120XI-137	Visual signal	Production started (fixed light) LOAD BALES Loading of bales completed (flashing light) DEWIRE BALES	Green
120XI-139	Visual signal	Loading conveyor full or running / Pulper production stopped (fixed light) CONVEYOR BUSY / PRODUCTION STOP	Red

3.2 FUNCTIONAL DESCRIPTION OF THE PULPER FEED SYSTEM

3.2.1 General

Automation controls are realized by a distributed control system (DCS). The pulping controls are operated from the stock preparation control room or paper machine control room. In addition, there are some local controls which are operated from a local control desk, 120CD-004. The pulper feed system can individually be operated in either remote or local mode. In remote mode the conveyors respond to the manual de-wiring and production demand in accordance with a predefined logic. In local mode it is possible to manually run the conveyors according to specific needs, e.g. during service or cleaning. The following sections give conceptual descriptions of operation in the two different modes.

Process settings, like values for timers and distance between bales are adjustable from the DCS. All settings are behind password.

The functional description foresees the use of variable frequency drive (VFD) on the pulper feed conveyor.

3.2.2 Bale loading and de wiring of bales on de wiring conveyor 120E-104

Function Bale loading and de-wiring

A stack of bales, normally consisting of three or four bales, is loaded onto the de-wiring conveyor 120E-104. Loading is allowed only if the green lamp 120XI-137 is lit.

The forklift driver loads one stack of bales activating limit switch 120GS1-122 located at the loading position of the de-wiring conveyor 120E-104. The forklift driver then takes a new grip and lifts the remaining stack of bales to release the

bottom bale still resting on the conveyor chains. A bale release sensor 120GS-121 prevents the de-wiring conveyor from starting if the stack is not lifted.

When a bale is detected on limit switch 120GS1-122 and the bale release sensor is deactivated, the loading conveyor is started after a preset time [timer #1]. The bale is then forwarded to give space to load another bale [timer # 2]. When [timer #2] has run out the conveyor is stopped, and the forklift driver puts down the remaining bales in the vacated position.

When a set of bales (normally 7) have been loaded [counter #1] the green light starts flashing indicating that the de-wiring conveyor is full and that manual de-wiring of the bales can be performed safely. The operator then lifts the batch of bales by pressing and holding the “hold to run” button 120HS1-124 and the use the selector switch 120HS1-124A/B for activating the conveyor lifting beam. The lifting beam can only be lifted if motor 120E-104-M1 is not running. All bales must be positioned within the operating length of the lifting beam before lifting can commence. The bale wires are manually cut and removed by hand. The lift beam is thereafter lowered by using the same pushbutton 120HS1-124 and selector switch 120HS1-124A/B.

The completion of the de-wiring is acknowledged by the operator by pressing the button 120HSI1-122. A white lamp is lit confirming the acknowledgement by the DCS. All bales are then forwarded to the stop position 120GS2-122. If the storage conveyor 120E-105 is ready to receive bales, all bales at the same time will be forwarded from the de-wiring conveyor to the pulper feed conveyor. The speed of the receiving storage conveyor is adjusted to ensure that all bales fit to the available space.
Bales are forwarded only if the storage conveyor is empty and is not interlocked by the pulper feed conveyor.

When no bale has reached the limit switch 120GS2-122 within a preset time [timer #3] the conveyor is considered empty and the conveyor will stop. The white lamp is switched off and a new set of bales of bales can be loaded for de-wiring.

Equipment

The function comprises the following devices:

- Bale limit switch for bale loading position, 120GS1-122
- Bale release sensor, 120GS-121
- Bale limit switch for bale stop position, 120GS2-122
- Limit switch for the lifting beam in lower position, 120GS1-124
- Pneumatic valve for control of the lifting beam up and down, 120HSV-124
- Pushbutton for de-wiring completion acknowledgement, 120HSI1-122
- Pushbutton 120HS1-124 and selector switch 120HS1-124A/B for control of the lifting beam up and down
- Conveyor motor, 120E-104-M1
- VFD for the pulper feed conveyor motor 120E-104-M1

3.2.3 Storage of bales on storage conveyor 120E-105

Function bale storage

The storage conveyor 120E-105 is receiving bales from the de-wiring conveyor 120E-104.

When the first bale in the set reaches the stop position 120GS2-123 the storage conveyor motor 120E-105-M1 will stop. The feeding from the de-wiring conveyor is then also stopped.

When the pulper feed conveyor is ready to receive bales the storage conveyor will feed all bales to the pulper feed conveyor.

When no bale has reached the limit switch 120GS2-123 within a preset time [timer #4] the conveyor is considered empty and a new set of bales can be received from the de-wiring conveyor.

Equipment

The function comprises the following devices:

- Bale limit switch for bale stop position, 120GS2-123
- Motor, 120E-105-M1
- VFD for the pulper feed conveyor motor 120E-105-M1

3.2.4 Pulper feeding of bales by pulper feed conveyor 120E-106

Function Pulper feeding

The pulper feed conveyor 120E-106 is running in batch mode, feeding the pulper with bales.
One set of bales is received from the storage conveyor 120E-105. When the first bale in the batch reaches the stop position 120GS2-127 the pulper feed conveyor motor 120E-106-M1 will stop. The feeding from the storage conveyor is then also stopped.

When a second set of bales is ready on the storage conveyor the batch is complete and ready to be fed into the pulper. At this point the total weight of all bales standing on the storage conveyor 120E-105 and pulper feed conveyor 120E-106 is registered.

When the pulper is ready to receive bales (pulper interlock is deactivated) the pulper feeding sequence starts and the pulper feed conveyor will start feeding all bales into the pulper. This is done by running the pulper feed conveyors at a slow continuous speed.

When no bale has reached the photocell 120GS2-127 within a preset time [timer #5] the conveyor is considered empty and the next set of bales can be received from the storage conveyor. When the bales reach photocell 120GS2-127, the bales will be fed into the pulper at reduced conveyor speed and without delay.

The pulper feed sequence is now ended and a new batch can be de-wired.

Equipment

The function comprises the following devices:

- Bale photocell for bale stop position, 120GS2-127
- Motor, 120E-106-M1

- VFD for the pulper feed conveyor motor 120E-106-M1

3.2.5 Local controls

Conveyor controls from control desk 120CD-004

The local control desk 120CD-004 is equipped with local control switches for manual interaction with each of the conveyors. 120HS1-122 / 120HS1-123 and 120HS1-127 for operating mode selection, having LOCAL and REMOTE positions and 120HS2-122A/B / 120HS2-123A/B and 120HS2-127A/B for FORWARD and REVERSE operation, for each conveyor. In LOCAL mode it is not possible to run the de-wiring conveyor in reverse when bale limit switch 120GS1-122 is activated, the pulper feed conveyor cannot be run forward when bale photocell 120GS2-127 is activated.

Local control switches for de-wiring conveyor 120E-104

The bales are loaded onto the conveyor in REMOTE position. With 120HS1-122 in REMOTE position the pulping sequence (DCS) can start and stop the conveyor. In LOCAL position the operator can run the de-wiring conveyor locally forward and reverse by using switch 120HS2-002A/B, e.g. during failures when loading bales. When selecting LOCAL position from REMOTE position, the conveyor is stopped immediately. The operator selects the REMOTE position when the conveyor can be set back to automatic operation.

120HS1-123 / 120HS2-123A/B and 120HS1-127 / 120HS2-127A/B, local control switches for pulper feed conveyors 120E-105 and 120E-106.
Same function as for 120E-104

Lifting beam controls

See section 4.2.2

Emergency stop controls

See section 4.2.7

3.2.6 Indications

Indicator bank for the de wiring conveyor 120E-104

Function Loading of bales

The indicator bank located by the de-wiring conveyor is equipped with auditory and visual signals for operational guidance.

auditory signal, 120XI-135
Before start of production the alarm horn gives a 5 second signal to inform operators that production will start shortly. The controls should then be set to REMOTE mode and the pulper feed system should be loaded with bales.

visual signal, 120XI-137
A fixed green light is lit when the pulper feed system is running in REMOTE mode. This means that bale loading is allowed.

A flashing green light is lit when the de-wiring conveyor has received a full set of bales and de-wiring can be performed safely.

visual signal, 120XI-139
A fixed red light is lit when the conveyor 120E-104 is busy, i.e. the conveyor is running, the conveyor is set to LOCAL mode or that the production is stopped. This means that bale loading is forbidden.

3.2.7 Bale handling emergency stops

General functions

The emergency stop input functions 120HZ2-996, 120GZ7-996, 120GZ8-996 …..120GZ12-996 are used for immediate stopping of the pulper feed system including pulper rotor and pump in case of emergency. All hazardous equipment in all lines shall be stopped from one emergency stop if several pulpers and pulper feed lines are present in same building.

The input functions are hardwired to a safety monitoring system (with relays or safety PLC) which will stop the pulping lines if any of the safety functions are activated.

The contact state of each of the emergency stop switches is wired to the safety monitoring system. The safety monitoring system can then forward the information to the DCS about which stop function that has been activated.

Emergency stop functions

If a safety function is activated, the safety relay initiates a shutdown of the contactor relay operation according to stop category 0 in compliance with EN 60204-1. This is done by switching off the control voltage to the contactor which will stop the motor circuit (hardwired and software interlock).

For the VFD controlled motors the Safe Torque Off (STO) function is used to stop the motor.

The emergency stop button does not affect the pneumatic valve on the de-wiring conveyor.

Emergency stop reset functions

If the safety relay has been activated, a reset of the safety relay must be done to restart the pulper feed system. This can be done with the illuminated push button 120HSI2-996A/B on the local control desk 120CD-004.

The relay monitors whether the contacts of the safety functions are closed, that all contactors are switched off and that the VFD has been brought to a stop with the following indications possible:

- Fixed blue light indicates that the emergency stop relay is possible to reset.
- Flashing blue light indicates that the safety relay is not possible to reset, i.e. that one or several emergencies stop functions still are active or that a fault has been detected.

Safety performance

The minimum required performance level for all safety functions is PL c according to ISO 13849-1.

Equipment

- The function comprises the following devices in the pulper feed system:
- Emergency stop button 120HZ2-996 with 3N/C contacts
- Emergency stop rope pull switch GZ4-996 with 3N/C contacts, located along the de-wiring conveyor chain beam
- Emergency stop rope pull switch GZ5-996 with 3N/C contacts, located along the pulper feed conveyor vat
- Emergency stop local acknowledge push button with indication light, 120HSI2-996A/B
- Emergency stop relay (located in MCC)
- VFD for motor 120E-104-M1
- VFD for motor 120E-105-M1

- VFD for motor 120E-106-M1
- Motor contactors for the pulper rotor
- Motor contactors for the pulper pump

Other equipment or functions connected to the E-stop group according to valid risk assessment

User interface

The status information of each of the emergency stop buttons and relays (=E-stop group) are shown on the DCS display. The emergency stop can be activated only from the field by using the emergency stop button or rope pull switches. The emergency stop can be acknowledged only from the field after each of the individual emergency stop switches are in healthy condition.

The control desk 120CD-004 shall be installed at a safe place with good visibility over the control zone to ensure that no-one is in hazardous position during operation.

4 REFERENCES TO OTHER DOCUMENTS

Documents that are referred to in this document is presented in Table 6

Table 6 References to other documents

Document	Document no.
Process Flow sheet	KSDM160095102
Safety of machinery - Electrical equipment of machines - Part 1: General requirements	IEC 60204-1
Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	EN ISO 13849-1

5 Revision history
The revision history for the document is presented in the table below.

Table 7 Revision history

Rev	Change information	Introduced	Signature
01			
02			
03			
0			

5 FUNCTIONS AND INTERLOCKS FOR THE BALE HANDLING

5.1.1 Definition of Terms

Loop and Valve Number

Loop identification number.

Process Function

A brief description of the loop operation

Point of Control

Whether DCS or local control.

Graphic Display

Title of graphic display

Permissive

A signal required that allows the equipment to be started. Once the equipment is in operation it will continue to operate even if the permissive signal is lost. This signal is required in all control modes unless stated otherwise.

Interlocks

A signal required to start and to continue to operate equipment. Without the interlock signal the equipment will not operate. The equipment will stop operating if it is operating when the signal is lost. This signal is required in all control modes unless stated otherwise.

Manual Mode

Description of manual operation requirements. The equipment must be selected in MANUAL for this operation.

Auto Mode

Description of automatic operation requirements. The equipment must be selected in AUTOMATIC for this operation.

Remote Function

Description of cascade operation requirements or when controlled by a remotely calculated set point. The equipment must be selected in REMOTE for this operation.

Indication

Definition of device status indications and location of indications.

Interlock limits

Definition of interlock requirements.

Alarms

Definition of alarm requirements

5.1.2 De-wiring conveyor 120E-104

Motor Number

120E-104M1

Process Function

The bales are being de wired on the conveyor before going to storage conveyor. The conveyors can run in forward and reverse mode: reverse mode is not accessible from DCS station.

Point of Control

DCS and Local operation

Graphic Display

Bale Handling System graphic, X.X

Permissive's

None

Interlocks

The conveyor will stop/cannot start:

-Lifting beam 120HS-124 is in upper position.

-The de-wiring conveyor cannot be run backwards if Local/Remote switch 120HS1-002 is in LOCAL AND control switch Forward/Reverse 120HS2-122 is selected in reverse AND bale limit switch 120GS1-122 is activated.

-The 120GS2-122 is activated, and storage conveyor not running.

-Emergency stop 120HZ-996 tripped, all e stops buttons and pull rope switches

Local Mode

The conveyor can be run in forward and reverse by the operator at the conveyor, local panel by switch 120HS2-122

Manual Mode

No DCS only manual mode

Auto Mode

The conveyer is started, in forward mode only, and by switch 120GS1-122 active

and fork lift presence sensor 120GS1-101 not activated.

The conveyor will run for xx seconds then stop as a part of conveyor loading operation.

The conveyor will also be a part of the conveyor transfer sequence.

Indication

Standard motor display.

5.1.3 Storage conveyor 120E-105

Motor Number

120E-105M1

Process Function

A set of bales is received from the de-wiring conveyor 120E-104. If the pulper feed conveyor 120E-106 is ready to receive bales, all bales at the time will be forwarded from the storage conveyor to the pulper feed conveyor.

Point of Control

Local and remote operation

Graphic Display

Bale Handling System graphic, X.X

Interlocks

The conveyor will stop cannot start:

-The de wiring conveyor cannot be run backwards if Local/Remote switch 120HS1-123 is in LOCAL AND control switch Forward/Reverse 120HS2-123 is selected in reverse AND bale limit switch 120GS1-123 is activated.

-The 120GS2-123 is activated, and storage conveyor not running.

-Emergency stop 120HZ2-996 tripped, all e stops buttons and pull rope switches

Local Mode

The conveyor can be run in forward and in reverse by the operator at the conveyor, local panel with switch 120HS2-123

Manual Mode

No DCS only manual mode

Auto Mode

The conveyor will start and stop in the conveyor sequence.

Indication

Standard motor display.

5.1.4 Pulper feed conveyor 120E-106

Motor Number

120E-106M1

Process Function

The conveyor transports bales from the storage conveyer to the bale pulper 121E-101.

Point of Control

Local and remote operation

Graphic Display

Bale Handling System graphic, X.X

Interlocks

The conveyer will stop cannot start:

-The pulper feed conveyor cannot be run backwards if Local/Remote switch 120HS1-127 is in LOCAL AND control switch Forward/Reverse 120HS2-127 is selected in reverse AND bale limit switch 120GS1-127 is activated.

-Emergency stop 120HZ-996 tripped, all e stops buttons and pull rope switches

- The pulper feed conveyor cannot be run forward if pulper level 121LI-101 not OK and bale limit switch GS2-127 is activated.

Local Mode

The conveyor can be run in forward and in reverse by the operator at the conveyor, local panel with switch 120HS2-127

Manual Mode

No DCS manual mode

Auto Mode

The conveyor will start and stop in the storage conveyor sequence and bale pulper sequence.

Indication

Standard motor display.

5.1.5 Bale release sensor - 120GS-121

Loop Number

120GS-121 - DI

Process Function

A bale release sensor 120GS-121 prevents the de wiring conveyor from starting if the stack is not lifted.

Point of Indication

No indication

Graphic Display

No System graphic

Indication

Green when activated

5.1.6 De-wiring conveyor Bale loading position at inlet end 120GS1-122

Loop Number

120GS1-122 - DI

Process Function

The switch is activated when a bale is placed on the de wiring conveyor at the loading zone,

Point of Control

The signal is activated when the bale is placed on top of the switch

Graphic Display

No graphic,

Indication

Green when activated

5.1.7 De-wiring conveyor Bale loading position at outlet end - 120GS2-122

Loop Number

120GS2-122

Process Function

The loop indicates when the de wiring conveyor is full. When the first bale reaches the switch the de wiring conveyor 120E-104-M1 stops and it is not possible to put on more bales.

Point of Control

The signal is activated when the bale is on top of the switch

Graphic Display

Bale Handling System graphic, X.X

Indication

Green when activated

5.1.8 De-wiring conveyor remote/local selector switch – 120HS1-122A and 120HS1-122B

Loop Number

120HS1-122A – DI

120HS1-122B - DI

Process Function

The de-wiring desk remote/local switch allows the operator to change the state of the de wiring conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-104 Remote mode

Selector Switch position left, conveyor 120E-104 Local mode

Point of control

Control desk CD004, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS”DE-WIRING IN LOCAL”

5.1.9 De-wiring conveyer forward / reverse selector switch 120HS2-122A/B

Loop Number

120HS2-122A -DI

120HS2-122B -DI

Process Function

The de-wiring conveyor “forward” selector allows the operator at the control desk 120CD-004 to drive the de-wiring conveyor forward: the de-wiring conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-122.

The de-wiring conveyor “reverse” selector allows the operator at the control desk 120CD-004 to drive the de-wiring conveyor in reverse: the de-wiring conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS1-122.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-122B.

Selector Switch position right, Conveyor 120E-104 Forward

Selector Switch position left, Conveyor 120E-104 Reverse

Point of Control

De-wiring/pulp conveyor control desk 120CD-004

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.10 De wiring complete HW illuminated push button 120HSI2-122A/B

Loop Number

120HSI2-122A – DI - Button

120HSI2-122B – DI - Light

Process Function

The de-wiring complete HW button is activated by the operator when all bales of HW are loaded and de wired on the conveyor. The push button will flash for 5 seconds and the operator needs to confirm selection by pushing the button once more with in this time. The light will illuminate solid and the signal will indicate in the DCS that the batch is ready to be fed on to the pulp conveyor by the conveyor sequence.

Point of Control

De-wiring/pulp conveyor control desk 120CD-004

Graphic Display

Bale handling system graphic 1.1

Indication

“De-wiring complete HW” is shown

5.1.11 Storage conveyor at inlet end 120GS1-123

Loop Number

120GS1-123 - DI

Process Function

The switch is activated when a bale is passing

Point of Control

The signal is activated when the bale is placed on top of the switch

Graphic Display

No graphic,

Indication

Green when activated

5.1.12 Storage conveyer Bale loading position at outlet end - 120GS2-123

Loop Number

120GS2-123

Process Function

The loop indicates when the storage conveyor is full. When the first bale reaches the switch the storage conveyor 120E-105-M1 stops and it is not possible to put on more bales.

Point of Control

The signal is activated when the bale is on top of the switch

Graphic Display

Bale Handling System graphic, X.X

Indication

Green when activated

5.1.13 Storage conveyor remote/local selector switch – 120HS1-123A and 120HS1-123B

Loop Number

120HS1-123A – DI

120HS1-123B - DI

Process Function

The control desk CD0 remote/local switch allows the operator to change the state of the storage conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-105 Remote mode

Selector Switch position left, conveyor 120E-105 Local mode

Point of control

Control desk CD004, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS ”STORAGE IN LOCAL”

5.1.14 Storage conveyer forward / reverse selector switch 120HS2-123A/ 120HS2-123B

Loop Number

120HS2-123A -DI

120HS2-123B -DI

Process Function

The storage conveyor “forward” selector allows the operator at the control desk 120CD-004 to drive the storage conveyor forward: the storage conveyor will run as long as the signal is maintained providing it is not stopped by an interlock or switch 120GS2-123.

The storage conveyor “reverse” selector allows the operator at the control desk 120CD-004 to drive the storage conveyor in reverse: the storage conveyor will run as long as the signal is maintained providing it is not stopped by an interlock or switch 120GS1-123.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-123B.

Selector Switch position right, Conveyor 120E-105 Forward

Selector Switch position left, Conveyor 120E-105 Reverse

Point of Control

Control desk 120CD-004

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.15 Lifting beam selector switch 120HS1-124A/B

Loop Number

120HS1-124A - DI

Process Function

The de-wiring conveyor lifting beam selector switch 120HS1-124A/B allows the operator at the control desk 120CD-004 to raise and lower the beam. The selector switch is activating solenoid valve 120HSV1-124A (up) and 120HSV1-124B (down).

This button operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-122B.

Selector Switch position right, lifting beam up

Selector Switch position left, lifting beam down

Point of Control

De-wiring/pulp conveyor control desk 120CD-004

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.16 Lifting beam up 120HSV1-124A

Loop Number

120HSV1-124A

Process Function

The lifting beam up solenoid valve is used to raise the de-wiring beam to upper position so the operator can de-wire the bales easier.

Point of control

Only local control at 12OCD-004

Point of Indication

No local indication

Graphic Display

No System graphic,

Indication

Standard indication

5.1.17 Lifting beam down 120HSV1-124B

Loop Number

120HSV1-124B

Process Function

The lifting beam down solenoid valve is used to lower the de-wiring beam to lower position after the operator have de-wire the bales.

Point of control

Only local control at 12OCD-004

Point of Indication

No local indication

Graphic Display

No System graphic,

Indication

Standard indication

5.1.18 Pulper feed conveyor Reverse interlock sensor 120GS1-127

Loop Number

120GS1-127 - DI

Process Function

The pulper feed conveyor cannot be run backwards if LOCAL control 120HS-127 is selected AND reverse interlocking sensor 120GS1-127 is activated, this is to prevent bales reversing onto the storage conveyor when the pulper feed conveyor is in reverse.

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, xx

Indication

Green when activated

5.1.19 Pulper feed conveyor loaded switch 120GS2-127

Loop Number

120GS2-127 - DI

Process Function

The loop indicates if any bales are at the top of the pulper feed conveyor. When the first bale reaches the switch the pulper feed conveyor 120E-106M1 stops.

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, xx

Indication

Green when activated

5.1.20 Pulper feed conveyor remote/local switch – 120HS1-127A/120HS1-127B

Loop Number

120HS1-127A – DI

120HS1-127B - DI

Process Function

The conveyor control desk CD004 remote/local switch allows the operator to change the state of the pulper feed conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-123 Remote mode

Selector Switch position left, conveyor 120E-123 Local mode

Point of control

Control desk CD004, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS ”LOADING IN LOCAL”

5.1.21 Pulper feed conveyer forward / reverse switch 120HS2-127A/120HS2-127B

Loop Number

120HS2-127A -DI

120HS2-127B -DI

Process Function

The pulper feed conveyor “forward” selector allows the operator at the control desk 120CD-004 to drive the pulper feed conveyor forward: the pulper feed conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-127.

The pulper feed conveyor “reverse” selector allows the operator at the control desk 120CD-004 to drive the feed conveyor in reverse: the feed conveyor will run as long the signal is maintained providing it is not stopped by an interlock (see 6.1.4) or switch 120GS1-127.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-127B.

Selector Switch position right, Conveyor 120E-106 Forward

Selector Switch position left, Conveyor 120E-106 Reverse

Point of Control

De-wiring/pulp conveyor control desk 120CD-004

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.22 Audio alarm “pre-warning conveyors start” – 120XI-135

Loop Number

120XI-135 - DO

Process Function

Before start of conveyor movement, the alarm horn gives a 5 second signal to inform operators that movement will start shortly. The controls should be set to REMOTE mode and the pulper feed system should be loaded with bales. This is a part of conveyor sequence, see 1.3.4

Point of control

No control in DCS

Graphic Display

No display

Indication

No indication

5.1.23 Load HW de-wiring conveyor A 120XI-137

Loop Number

120XI-137 - DO

Process Function

A fixed blue light is lit when the pulper feed system is running in REMOTE mode and hardwood bale loading is allowed.

A flashing blue light is lit when the de wiring conveyor has received a full batch of bales and de wiring can be performed safely

Point of control

No control in DCS

Graphic Display

No display

Indication

No indication

6.1.25 Light indicator “Conv. Busy”120XI-139

Loop Number

120XI-139 - DO

Process Function

A fixed red light is illuminated when the conveyor 120E-105 is busy, i.e. the conveyor is running, the conveyor is set to LOCAL mode or that the production is stopped. This means that bale loading is forbidden if:

- Transferring sequence ongoing conveyor 120E-104
- Transferring sequence ongoing conveyor 120E-106

Point of control

No control in DCS

Graphic Display

NA

Indication

NA

5.1.24 Weighing system – 120WI-130

Loop Number

120WI-130 – No I/O

Process Function

The loop collects data from eight weight cells on the pulper feed conveyor the weight of the bal used for calculating the correct amount of water to be added in the pulper.

The weighing system with eight weigh modules (load cells) is shown in Figure 3 and described in Table 3.

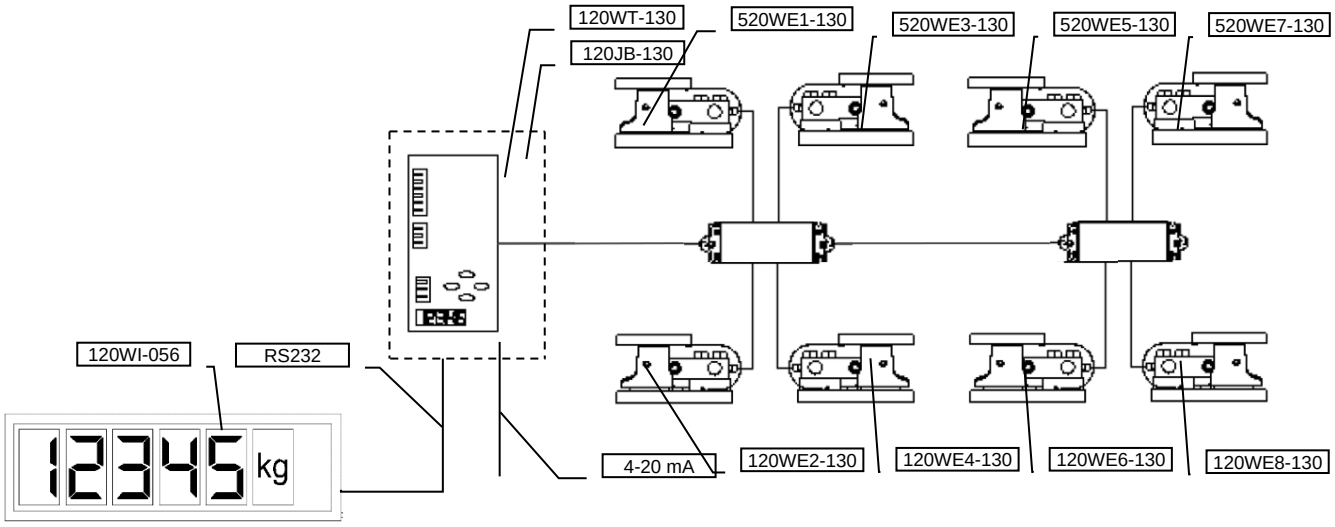


Figure 6 Weighing system with eight load cells

Table 3 Description of the weighing system

Standard Item/Tag	Customer Item/Tag	Device	Function
120WI-130		External display	Large display to visualize the loaded weight for the operator
120WT-130		Weighing terminal	Weighing terminal with weight indication
120JB-130		Junction box	Junction box for the weighing terminal
120JB-130.1		Load cell junction box #1	Precision junction box for multiple load cell connection

120JB-130.2		Load cell junction box #2	Precision junction box for multiple load cell connection
120WE1-130		Load cell #1	Load cell for weight registration
120WE2-130		Load cell #2	Load cell for weight registration
120WE3-130		Load cell #3	Load cell for weight registration
120WE4-130		Load cell #4	Load cell for weight registration
120WE5-130		Load cell #5	Load cell for weight registration
120WE6-130		Load cell #6	Load cell for weight registration
120WE7-130		Load cell #7	Load cell for weight registration
120WE8-130		Load cell #8	Load cell for weight registration

Point of Indication

External local display

Graphic Display

In DCS

Indication

Total weight is showed

5.1.25 Conveyor system control desk 120CD-004

Desk Number

120CD-004

Process Function

To enable operation of the de wiring and pulp conveyor locally

Point of Control

DCs and Local operation

Graphic Display

No display

Local Mode

The de-wiring and pulp conveyor can be operated locally by the operator.

de-wiring and loading

In auto mode the DCS takes over control. The de-wiring and pulp conveyor are controlled by the conveyor sequence.

Indication

NA

5.1.26 Emergency stop bale handling 120HZ2-996

Loop Number

120HZ2-996A

Process Function

Mush room button in control desk CD004

Emergency stop for bale handling system.

When emergency stop is activated at the control desk following will stop

- Pulper 121E-101-M1
- Pulper feed conveyor 120E-106-M1
- Storage conveyor 120E-105-M1
- De-wiring conveyor 120E-104-M1

Reset of emergency stop at local control desk 120CD-004 120HS2-996A

Point of Control

Mush room button in control desk CD001

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.27 De wiring conveyor rope pull safety switch 120GZ7,8-996

Loop Number

120GZ7,8-996 DIZ

Process Function

A safety rope is mounted on the side of de wiring conveyor, if this is pulled and switch 120GZ7,8-996 is activated the emergency stop will be activated and following will be stopped

- Pulper 121E-101-M1
- Pulper feed conveyor 120E-106-M1
- Storage conveyor 120E-105-M1
- De-wiring conveyor 120E-104-M1

Reset of emergency stop at local control desk 120CD-004 120HSI-996A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.28 Pulper feed conveyor rope pull safety switch 120GZ9,10-996

Loop Number

120GZ9,10-996 DIZ

Process Function

A safety rope is mounted in the roof of the pulper feed conveyor canape, if this is pulled and switch 120GZ9,10-996 is activated the emergency stop will be activated, and following will be stopped

- Pulper 121E-101-M1
- Pulper feed conveyor 120E-106-M1
- Storage conveyor 120E-105-M1
- De-wiring conveyor 120E-104-M1

Reset of emergency stop at local control desk 120CD-004 120HZI-996A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.29 Pulper feed conveyor rope pull safety switch 120GZ11,12-996

Loop Number

120GZ11,12-996 DIZ

Process Function

A safety rope is mounted in the roof of the pulper feed conveyor canape, if this is pulled and switch 120GZ11,12-996 is activated the emergency stop will be activated, and following will be stopped

- Pulper 121E-101-M1
- Pulper feed conveyor 120E-106-M1
- Storage conveyor 120E-105-M1
- De-wiring conveyor 120E-104-M1

Reset of emergency stop at local control desk 120CD-004 120HSI2-996A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.30 Emergency stop reset illuminated push button 120HSI2-996A/B

Loop Number

120HSI2-996A – DI - reset

120HSI2-996B – DO – light for emergency stop tripped

Process Function

- If the safety relay has been activated, a reset of the safety relay must be done to restart the pulper feed system. This can be done with the illuminated push button HZI-996A on the local control desk CD-004.
- Fixed blue light indicates that the emergency stop relay is possible to reset

Point of Control

Control desk 120CD-004

Graphic Display

Bale handling system graphic 1.1

Indication

Blue light in control desk is shown

5.2 CONVEYOR SEQUENCE

Note that all interlocks are valid all times and will override any Sequence logic where applicable.

Note that the Sequence logic is valid only whilst the Sequence is active but will override any other logic (with exception of interlocks) during that time where applicable.

The start sequence for the conveyor system consist of three types of transferring sequences

1. De wiring to storage
2. Storage to loading
3. Loading sequence for pulper

The concept for starting the sequences is that then system is in auto the conveyor will start if the next conveyor is empty.

First batch

- Load de wiring conveyor and de-wire
- The operator now pushes “de-wiring complete HW” 120HSI1-122 or 120HSI2-122 on control desk CD004.

  Now the sequence is ready to start

Sequence permissive

Before being available for selection, the sequence requires the following conditions to be met:

- De wiring conveyor 120E-104 M1 in Remote

- Storage conveyor 120E-105 M1 in Remote
- Pulper feed conveyor 120E-106M1 in Remote
- Signal from “De wiring complete” activated

5.2.1 Start sequence 1

Bales on de wiring conveyor to be moved to end of storage conveyor

Sequence will start if 120GS2-123 bales position in outlet end storage conveyor not activated.

Step 1. START SEQUENCE 1

- Pre warning conveyors start, audible alarm 120XI-135 activates for 5 sec before conveyors start- Timer T4

Before going to next step, the sequence checks following conditions are met:

- End of Timer T4 120XI-135 go off

Step 2. START CONVEYORS

- Start De wiring conveyor 120E-104M1
- Start storage conveyor 120E-105M1
- Activate visual signal 120XI-139 conveyor system A busy

Now one batch transferred from de wiring conveyor on to the storage conveyor

Before going to next step, the sequence checks following conditions are met:

- De wiring conveyor 120E-104M1 - RUN
- Storage conveyor 120E-105M1- RUN

Step 3. STOP PRE-WARNING

Before going to next step, the sequence checks following conditions are met:

- Storage conveyor bale loaded in outlet end switch 120GS2-123 to be activated.

Step 4. STOP CONVEYORS

- Stop De wiring conveyor 120E-104M1
- Stop storage conveyor 120E-104M1
- Indication light 120XI-139 go off

Before going to step 1 the sequence checks following conditions are met:

- De wiring conveyor 120E-104M1 - Stop
- Storage conveyor 120E-105M1- Stop

One batch is now waiting to be feed over to the pulper feed conveyor, now the operator can load and de wire a new batch.

5.2.2 Start sequence 2

Bales from storage conveyor to be moved to pulper feed conveyor.

Sequence will start if 120GS2-127 not activated by bales in upper position.

Step 1. START SEQUENCE 2

- Pre warning conveyors start, audible alarm 120XI-135 activates for 5 sec before conveyors start- Timer T1

Before going to next step, the sequence checks following conditions are met:

- End of Timer T1 120ZXI-135 go off

Step 2. START CONVEYORS

- Start Storage conveyor 120E-105M1
- Start pulper feed conveyor 120E-106M1
- Activate visual signal 120XI-139 conveyor system busy

Now one batch is going of the storage and up on the pulper feed conveyor

Before going to next step, the sequence checks following conditions are met:

- Storage conveyor 120E-105M1 - RUN
- Pulper feed conveyor 120E-106M1- RUN

Step 3. STOP PRE-WARNING

Before going to next step, the sequence checks following conditions are met:

- Pulper feed conveyor bale loaded in outlet end switch 120GS2-127 to be activated.

Step 4. STOP CONVEYORS

- Stop Storage conveyor 120E-105M1
- Stop pulper feed conveyor 120E-106M1
- Indication light 120XI-139 go off

Before going to step 1 the sequence checks following conditions are met:

- Storage conveyor 120E-105M1 - Stop
- Pulper feed conveyor 120E-106M1- Stop

5.2.3 Start sequence 3

Bales on pulper feed conveyor to be entering the pulper

Sequence 3 will start when signal is activated from pulper sequence

This will be a part of the pulper sequence.

1.1 BALE HANDLING NEPTUNE SW LINE

						APPROVALS		
Issue	**Date**	**Pages**	**Issue Description**			**By**	**Check**	**Approve**
00	20-09-17		Preliminary			NOM	FKC	
■	Entire Specification Issued this Revision		SPECIFICATION ISSUED FOR:					
			■	Review		☐	Purchase	
☐	Revised Pages Only Issued this Revision		☐	Client Approval		☐	Construction	
			☐	Enquiry		☐		

TABLE OF CONTENTS

1 PURPOSE OF THE FUNCTIONAL DESCRIPTION 1
2 GENERAL 1
3 FUNCTIONAL DESCRIPTION 3
3.1 **GENERAL** 3
3.1.1 Main equipment 3
3.1.2 Electrical equipment and components 4
3.1.3 Weighing system 6
3.1.4 Local controls 7
3.1.5 Indications 9
3.2 **FUNCTIONAL DESCRIPTION OF THE PULPER FEED SYSTEM** 10
3.2.1 General 10
3.2.2 Bale loading and de-wiring of bales on de wiring conveyor 120E-001 10
3.2.3 Storage of bales on storage conveyor 120E-002 13
3.2.4 Pulper feeding of bales by pulper feed conveyor 120E-003 14
3.2.5 Local controls 16
3.2.6 Indications 17
3.2.7 Bale handling emergency stops 18
4 REFERENCES TO OTHER DOCUMENTS 21
5 FUNCTIONS AND INTERLOCKS FOR THE BALE HANDLING 22
5.1.1 Definition of Terms 22
5.1.2 De-wiring conveyor 120E-001 24
5.1.3 Storage conveyor 120E-002 26
5.1.4 Pulper feed conveyor 120E-003 28
5.1.5 Bale release sensor - 120GS-001 30
5.1.6 De wiring conveyor Bale loading position at inlet end 120GS1-002 31
5.1.7 De-wiring conveyor Bale loading position at outlet end - 120GS2-002 32
5.1.8 De-wiring conveyor remote/local selector switch – 120HS1-002A and 120HS1-002B 33
5.1.9 De-wiring conveyer forward / reverse selector switch 120HS2-002A/B 34
5.1.10 De wiring complete SW illuminated push button 120HSI1-002A/B 35
5.1.11 Storage conveyor at inlet end 120GS1-003 36
5.1.12 Storage conveyer Bale loading position at outlet end - 120GS2-003 37
5.1.13 Storage conveyor remote/local selector switch – 120HS1-003A and 120HS1-003B 38
5.1.14 Storage conveyer forward / reverse selector switch 120HS2-003A/ 120HS2-003B 39
5.1.15 Lifting beam selector switch 120HS1-004A/B 40
5.1.16 Lifting beam up 120HSV1-004A 41
5.1.17 Lifting beam down 120HSV1-004B 42
5.1.18 Pulper feed conveyor Reverse interlock sensor 120GS1-007 43
5.1.19 Pulper feed conveyor loaded switch 120GS2-007 44
5.1.20 Pulper feed conveyor remote/local switch – 120HS1-007A/120HS1-007B 45
5.1.21 Pulper feed conveyer forward / reverse switch 120HS2-007A/120HS2-007B 46
5.1.22 Audio alarm "pre warning conveyors start" – 120XI-015 47
5.1.23 Load SW de wiring conveyor A 120XI-017 48
5.1.24 Light indicator "Conv. Busy"120XI-019 49
5.1.25 Weighing system – 120WI-010 50
5.1.26 Conveyor system control desk 120CD-001 52
6.1.27 Emergency stop bale handling 120HZ1-995 53
5.1.27 De-wiring conveyor rope pull safety switch 120GZ1,2-995 54

5.1.28 Pulper feed conveyor rope pull safety switch 120GZ3,4-995 55
5.1.29 Pulper feed conveyor rope pull safety switch 120GZ5,6-995 56
5.1.30 Emergency stop reset illuminated push button 120HSI-995A/B 57
5.2 CONVEYOR SEQUENCE 58
5.2.1 Start sequence 1 59
5.2.2 Start sequence 2 61
5.2.3 Start sequence 3 63

1 PURPOSE OF THE FUNCTIONAL DESCRIPTION

The purpose of this document is to give a general view of the function of the equipment included in the delivery from Valmet.

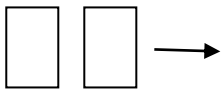
The functional description is to be used by electrical designers, programmers of the automation system as well as process operators.

Only process functions and interlocks are described in this function description. Basic MCC interlocks, MCC faults, measurement faults, valve position monitoring and other common standard functions that are applied to all zones are not described in this function description. Only if exceptions are needed, they will be mentioned case by case in this description.

2 GENERAL

The bale handling system brings virgin pulp bales from the pulp yard to the pulper for slushing in a batch sequence. The system consists of a de-wiring conveyor of type MDB, a storage conveyor and a pulper feed conveyor of type CHB-FD.

The bales are loaded as stacks of bales by a forklift truck. The bales are oriented with the long side in the conveyor transport direction.



De stacking is done on the de-wiring conveyor by the forklift operator following the signals on the indicator bank. As many bales as required in the batch are loaded onto the conveyor. The de-wiring conveyor cannot take the whole batch so the de-wiring must be done in two sequences.

When the first set of bales have been loaded the operator lifts all bales with a lifting beam integrated in the conveyor. The bale wires are then manually cut and removed by hand.
A second set of bales are thereafter loaded and de-wired. When de-wiring is completed the operator lowers the bales onto the conveyor chains and acknowledges the completion of the de-wiring sequence. The bales then continue to the intermediate storage conveyor.

The final batch of bales standing on the pulper feed conveyor and the storage conveyor is weighed all together and brought to the pulper inlet chute for slushing.

3 FUNCTIONAL DESCRIPTION

3.1 GENERAL

3.1.1 Main equipment

Main equipment included in the pulper feed system are shown in Figure 1 and described in Table 1.

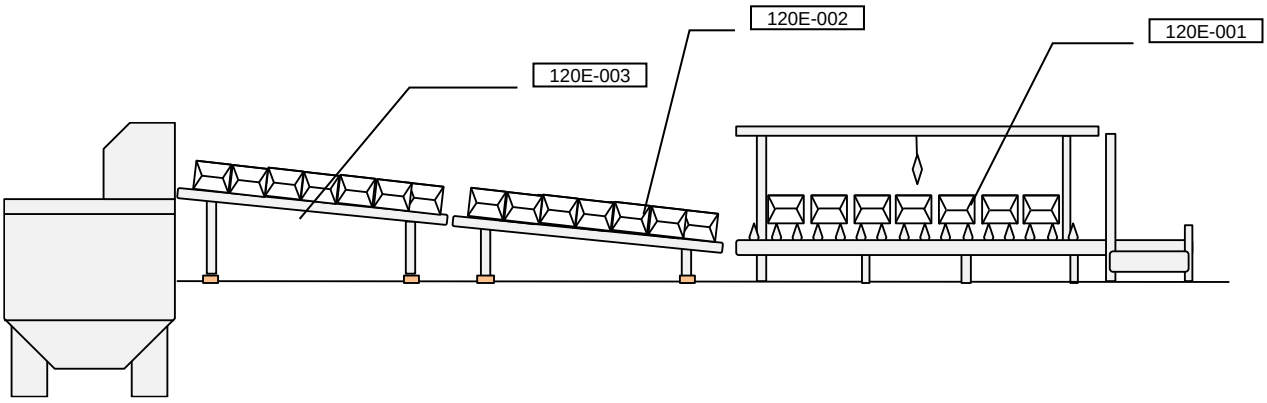


Figure 1 Main equipment included in the pulper feed system

Table 1 Description of main equipment in the pulper feed system

Standard Item/Tag	Function	Description
120E-001	De-wiring of bales	Manual de-wiring conveyor, type MDB3015H07-L Conveying speed 0.1 - 0.3 m/s (VFD)
120E-002	Intermediate storage of bales	Storage conveyor, type CHB370-FD Conveying speed 0.1 - 0.3 m/s (VFD)
120E-003	Pulper feeding of bales	Storage conveyor, type CHB370-FD Conveying speed 0.1 - 0.3 m/s (VFD)

3.1.2 Electrical equipment and components

Electrical equipment and components are shown in Figure 2 and described in Table 2.

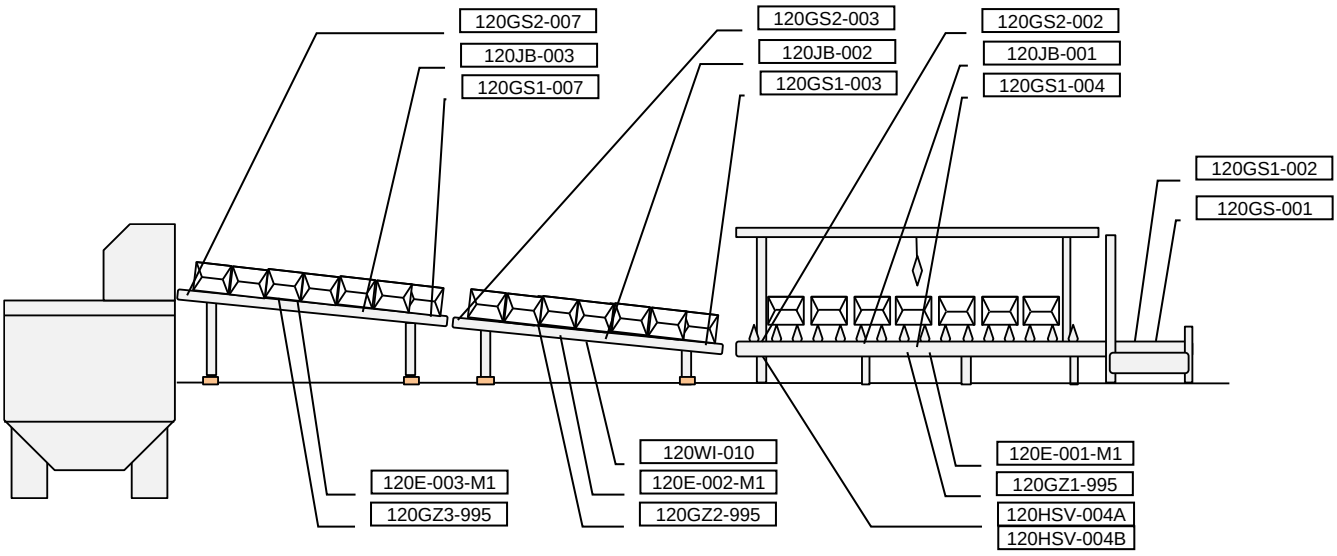


Figure 2 Electrical equipment and components included in the pulper feed system

Table 2 Description of electrical components included in the pulper feed system

Item/Tag	Device	Function
120E-001-M1	Motor	Electrical gear motor for de-wiring conveyor
120JB-001	Junction box	Junction box for conveyor
120GS-001	Photocell	Bale release sensor
120GS1-002	Limit switch	Bale loading position at inlet end
120GS2-002	Limit switch	Bale stop position at outlet end
120GS1-004	Limit switch	Lifting beam in lower position
120HSV-004A	Pneumatic valve – coil 14	Lifting beam up
120HSV-004B	Pneumatic valve – coil 12	Lifting beam down
120GZ7,8-995	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120E-002-M1	Motor with brake	Electrical gear motor with brake for storage conveyor

Item/Tag	Device	Function
120JB-002	Junction box	Junction box for conveyor
120GS1-003	Limit switch	Bale loading position at inlet end
120GS2-003	Limit switch	Bale stop position at outlet end
120GZ9,10-995	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120GS1-007	Limit switch	Bale loading position at inlet end
120GS2-007	Limit switch	Bale stop position at outlet end
120GZ11,12-995	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120E-003-M1	Motor with brake	Electrical gear motor with brake for storage conveyor
120JB-003	Junction box	Junction box for conveyor
120WI-010	Weighing system	Batch weight

3.1.3 Weighing system

The weighing system is shown in Figure 3 and described in Table 3.

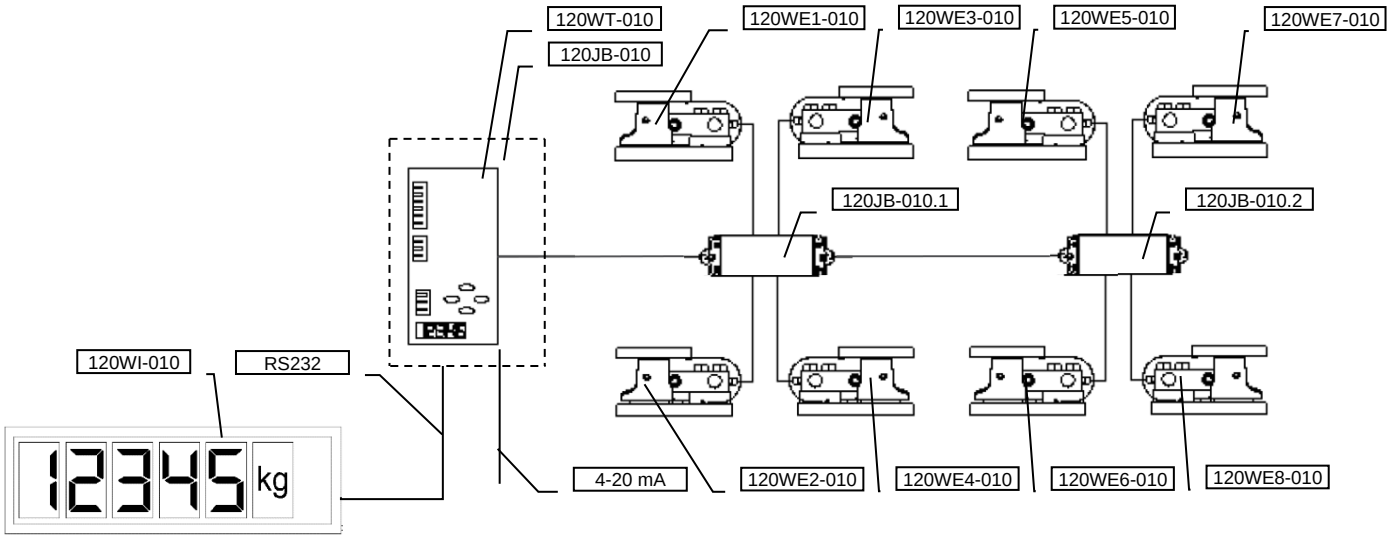


Figure 3 Weighing system with six load cells

Table 3 Description of the weighing system

Customer Item/Tag	Device	Function
120WI-010	External display	Large display to visualize the loaded weight for the operator
120WT-010	Weighing terminal	Weighing terminal with weight indication
120JB-010	Junction box	Junction box for the weighing terminal
120JB-010.1	Load cell junction box #1	Precision junction box for multiple load cell connection
120JB-010.2	Load cell junction box #2	Precision junction box for multiple load cell connection
120WE1-010	Load cell #1	Load cell for weight registration
120WE2-010	Load cell #2	Load cell for weight registration
120WE3-010	Load cell #3	Load cell for weight registration
120WE4-010	Load cell #4	Load cell for weight registration
120WE5-010	Load cell #5	Load cell for weight registration
120WE6-010	Load cell #6	Load cell for weight registration
120WE7-010	Load cell #7	Load cell for weight registration
120WE8-010	Load cell #8	Load cell for weight registration

3.1.4 Local controls

Local controls are shown in Figure 4 and described in Table 4.

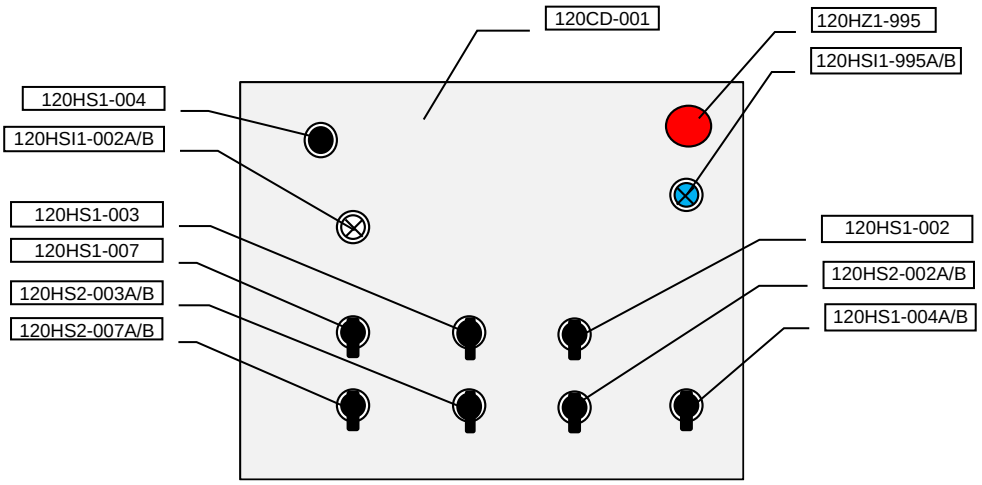


Figure 4 Local controls in the pulper feed system

Table 4 Description of electrical components for control of the pulper feed system

Customer Item/Tag	Device	Function	Color
120CD-001	Control desk	Local control desk for the pulper feed system	-
120HZ1-995	Mushroom push button	Emergency stop	Red
120HSI1-995	Illuminated push button	Emergency stop reset	-
120HSI1-995A	Push button	Reset function	-
120HSI1-995B	Indication lamp	Emergency stop tripped	Blue
120HSI1-002	Illuminated push button	De-wiring completed	-
120HSI1-002A	Push button	De-wiring completed	-
120HSI1-002B	Indication lamp	De-wiring completed acknowledgement	White
120HS1-004	Push button	Hold to run	White
120HS1-004A	Selector Switch position right	Lifting beam up	-
120HS1-004B	Selector Switch position left	Lifting beam down	-

Table continued on next page

Table 4 Continuation from previous page

Customer Item/Tag	Device	Function	
120HS1-002	Selector Switch	Conveyor 120E-001 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-001 Remote mode	-
-	Selector Switch position left	Conveyor 120E-001 Local mode	-
120HS2-002	Selector Switch	Conveyor 120E-001 Forward/0/Reverse operation	Black
120HS2-002A	Selector Switch position right	Conveyor 120E-001 Forward	-
120HS2-002B	Selector Switch position left	Conveyor 120E-001 Reverse	-
120HS1-003	Selector Switch	Conveyor 120E-002 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-002 Remote mode	-
-	Selector Switch position left	Conveyor 120E-002 Local mode	-
120HS2-003	Selector Switch	Conveyor 120E-002 Forward/Reverse operation	Black
120HS2-003A	Selector Switch position right	Conveyor 120E-002 Forward	-
120HS2-003B	Selector Switch position left	Conveyor 120E-002 Reverse	-
120HS1-007	Selector Switch	Conveyor 120E-003 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-003 Remote mode	-
-	Selector Switch position left	Conveyor 120E-003 Local mode	-
120HS2-007	Selector Switch	Conveyor 120E-003 Forward/Reverse operation	Black
120HS2-007A	Selector Switch position right	Conveyor 120E-003 Forward	-
120HS2-007B	Selector Switch position left	Conveyor 120E-003 Reverse	-

3.1.5 Indications

Indications are shown in Figure 5 and described in Table 5.

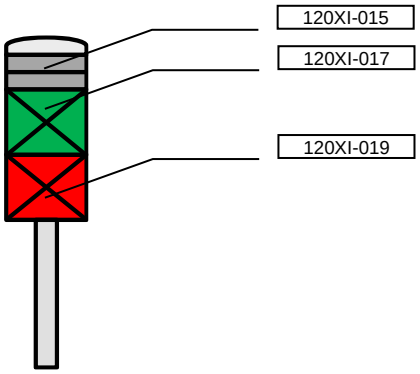


Figure 5 Indicator bank for the de-wiring conveyor

Table 5 Description of the indicator bank for the de-wiring conveyor

Customer Item/Tag	Device	Description	Color
120XI-015	Alarm horn	Auditory signal PRODUCTION START	-
120XI-017	Visual signal	Production started (fixed light) LOAD BALES Loading of bales completed (flashing light) DEWIRE BALES	Green
120XI-019	Visual signal	Loading conveyor full or running / Pulper production stopped (fixed light) CONVEYOR BUSY / PRODUCTION STOP	Red

3.2 FUNCTIONAL DESCRIPTION OF THE PULPER FEED SYSTEM

3.2.1 General

Automation controls are realized by a distributed control system (DCS). The pulping controls are operated from the stock preparation control room or paper machine control room. In addition, there are some local controls which are operated from a local control desk, 120CD-001. The pulper feed system can individually be operated in either remote or local mode. In remote mode the conveyors respond to the manual de-wiring and production demand in accordance with a predefined logic. In local mode it is possible to manually run the conveyors according to specific needs, e.g. during service or cleaning. The following sections give conceptual descriptions of operation in the two different modes.

Process settings, like values for timers and distance between bales are adjustable from the DCS. All settings are behind password.

The functional description foresees the use of variable frequency drive (VFD) on the pulper feed conveyor.

3.2.2 Bale loading and de-wiring of bales on de wiring conveyor 120E-001

Function Bale loading and de-wiring

A stack of bales, normally consisting of three or four bales, is loaded onto the de-wiring conveyor 120E-001. Loading is allowed only if the green lamp 120XI-017 is lit.

The forklift driver loads one stack of bales activating limit switch 120GS1-002 located at the loading position of the de-wiring conveyor 120E-001. The forklift driver then takes a new grip and lifts the remaining stack of bales to release the

bottom bale still resting on the conveyor chains. A bale release sensor 120GS-001 prevents the de-wiring conveyor from starting if the stack is not lifted.

When a bale is detected on limit switch 120GS1-002 and the bale release sensor is deactivated, the loading conveyor is started after a preset time [timer #1]. The bale is then forwarded to give space to load another bale [timer # 2]. When [timer #2] has run out the conveyor is stopped, and the forklift driver puts down the remaining bales in the vacated position.

When a set of bales (normally 7) have been loaded [counter #1] the green light starts flashing indicating that the de-wiring conveyor is full, and that manual de-wiring of the bales can be performed safely. The operator then lifts the batch of bales by pressing and holding the “hold to run” button 120HS1-004 and the use the selector switch 120HS1-004A/B for activating the conveyor lifting beam. The lifting beam can only be lifted if motor 120E-001-M1 is not running. All bales must be positioned within the operating length of the lifting beam before lifting can commence. The bale wires are manually cut and removed by hand. The lift beam is thereafter lowered by using the same pushbutton 120HS1-004 and selector switch 120HS1-004A/B.

The completion of the de-wiring is acknowledged by the operator by pressing the button 120HSI1-002. A white lamp is lit confirming the acknowledgement by the DCS. All bales are then forwarded to the stop position 120GS2-002. If the storage conveyor 120E-002 is ready to receive bales, all bales at the same time will be forwarded from the de-wiring conveyor to the pulper feed conveyor. The speed of the receiving storage conveyor is adjusted to ensure that all bales fit to the available space.
Bales are forwarded only if the storage conveyor is empty and is not interlocked by the pulper feed conveyor.

When no bale has reached the limit switch 120GS2-002 within a preset time [timer #3] the conveyor is considered empty and the conveyor will stop. The white lamp is switched off and a new set of bales of bales can be loaded for de-wiring.

Equipment

The function comprises the following devices:

- Bale limit switch for bale loading position, 120GS1-002
- Bale release sensor, 120GS-001
- Bale limit switch for bale stop position, 120GS2-002
- Limit switch for the lifting beam in lower position, 120GS1-004
- Pneumatic valve for control of the lifting beam up and down, 120HSV-004
- Pushbutton for de-wiring completion acknowledgement, 120HSI1-002
- Pushbutton 120HS1-004 and selector switch 120HS1-004A/B for control of the lifting beam up and down
- Conveyor motor, 120E-001-M1
- VFD for the pulper feed conveyor motor 120E-001-M1

3.2.3 Storage of bales on storage conveyor 120E-002

Function bale storage

The storage conveyor 120E-002 is receiving bales from the de-wiring conveyor 120E-001.

When the first bale in the set reaches the stop position 120GS2-003 the storage conveyor motor 120E-002-M1 will stop. The feeding from the de-wiring conveyor is then also stopped.

When the pulper feed conveyor is ready to receive bales the storage conveyor will feed all bales to the pulper feed conveyor.

When no bale has reached the limit switch 120GS2-003 within a preset time [timer #4] the conveyor is considered to be empty and a new set of bales can be received from the de-wiring conveyor.

Equipment

The function comprises the following devices:

- Bale limit switch for bale stop position, 120GS2-003
- Motor, 120E-002-M1
- VFD for the pulper feed conveyor motor 120E-002-M1

3.2.4 Pulper feeding of bales by pulper feed conveyor 120E-003

Function: Pulper feeding

The pulper feed conveyor 120E-003 is running in batch mode, feeding the pulper with bales.
One set of bales is received from the storage conveyor 120E-002. When the first bale in the batch reaches the stop position 120GS2-007 the pulper feed conveyor motor 120E-003-M1 will stop. The feeding from the storage conveyor is then also stopped.

When a second set of bales is ready on the storage conveyor the batch is complete and ready to be fed into the pulper. At this point the total weight of all bales standing on the storage conveyor 120E-002 and pulper feed conveyor 120E-003 is registered.

When the pulper is ready to receive bales (pulper interlock is deactivated) the pulper feeding sequence starts and the pulper feed conveyor will start feeding all bales into the pulper. This is done by running the pulper feed conveyors at a slow continuous speed.

When no bale has reached the photocell 120GS2-007 within a preset time [timer #5] the conveyor is considered empty and the next set of bales can be received from the storage conveyor. When the bales reach photocell 120GS2-007, the bales will be fed into the pulper at reduced conveyor speed and without delay.

The pulper feed sequence is now ended and a new batch can be de-wired.

Equipment
The function comprises the following devices:

- Bale photocell for bale stop position, 120GS2-007
- Motor, 120E-003-M1

- VFD for the pulper feed conveyor motor 120E-003-M1

3.2.5 Local controls

Conveyor controls from control desk 120CD-001

The local control desk 120CD-001 is equipped with local control switches for manual interaction with each of the conveyors. 120HS1-002 / 120HS1-003 and 120HS1-007 for operating mode selection, having LOCAL and REMOTE positions and 120HS2-002A/B / 120HS2-003A/B and 120HS2-007A/B for FORWARD and REVERSE operation, for each conveyor. In LOCAL mode it is not possible to run the de-wiring conveyor in reverse when bale limit switch 120GS1-002 is activated, the pulper feed conveyor cannot be run forward when bale photocell 120GS2-007 is activated.

Local control switches for de-wiring conveyor 120E-001

The bales are loaded onto the conveyor in REMOTE position. With 120HS1-002 in REMOTE position the pulping sequence (DCS) can start and stop the conveyor. In LOCAL position the operator can run the de-wiring conveyor locally forward and reverse by using switch 120HS2-002A/B, e.g. during failures when loading bales. When selecting LOCAL position from REMOTE position, the conveyor is stopped immediately. The operator selects the REMOTE position when the conveyor can be set back to automatic operation.

120HS1-003 / 120HS2-003A/B and 120HS1-007 / 120HS2-007A/B, local control switches for pulper feed conveyors 120E-002 and 120E-003.
Same function as for 120E-001

Lifting beam controls

See section 4.2.2

Emergency stop controls

See section 4.2.7

3.2.6 Indications

Indicator bank for the de wiring conveyor 120E-001

Function Loading of bales

The indicator bank located by the de-wiring conveyor is equipped with auditory and visual signals for operational guidance.

Auditory signal, 120XI-015
Before start of production the alarm horn gives a 5 second signal to inform operators that production will start shortly. The controls should then be set to REMOTE mode and the pulper feed system should be loaded with bales.

Visual signal, 120XI-017
A fixed green light is lit when the pulper feed system is running in REMOTE mode. This means that bale loading is allowed.

A flashing green light is lit when the de-wiring conveyor has received a full set of bales and de-wiring can be performed safely.

Visual signal, 120XI-019
A fixed red light is lit when the conveyor 120E-001 is busy, i.e. the conveyor is running, the conveyor is set to LOCAL mode or that the production is stopped. This means that bale loading is forbidden.

3.2.7 Bale handling emergency stops

General functions

The emergency stop input functions 120HZ1-995, 120GZ1-995, 120GZ2-995 ….120GZ6-995 are used for immediate stopping of the pulper feed system including pulper rotor and pump in case of emergency. All hazardous equipment in all lines shall be stopped from one emergency stop if several pulpers and pulper feed lines are present in same building.

The input functions are hardwired to a safety monitoring system (with relays or safety PLC) which will stop the pulping lines if any of the safety functions are activated.

The contact state of each of the emergency stop switches is wired to the safety monitoring system. The safety monitoring system can then forward the information to the DCS about which stop function that has been activated.

Emergency stop functions

If a safety function is activated, the safety relay initiates a shutdown of the contactor relay operation according to stop category 0 in compliance with EN 60204-1. This is done by switching off the control voltage to the contactor which will stop the motor circuit (hardwired and software interlock).

For the VFD controlled motors the Safe Torque Off (STO) function is used to stop the motor.

The emergency stop button does not affect the pneumatic valve on the de-wiring conveyor.

Emergency stop reset functions

If the safety relay has been activated, a reset of the safety relay must be done to restart the pulper feed system. This can be done with the illuminated push button 120HSI1-995A/B on the local control desk 120CD-001.

The relay monitors whether the contacts of the safety functions are closed, that all contactors are switched off and that the VFD has been brought to a stop with the following indications possible:

- Fixed blue light indicates that the emergency stop relay is possible to reset.
- Flashing blue light indicates that the safety relay is not possible to reset, i.e. that one or several emergencies stop functions still are active or that a fault has been detected.

Safety performance

The minimum required performance level for all safety functions is PL c according to ISO 13849-1.

Equipment

- The function comprises the following devices in the pulper feed system:
- Emergency stop button 120HZ1-995 with 3N/C contacts
- Emergency stop rope pull switch GZ1-995 with 3N/C contacts, located along the de-wiring conveyor chain beam
- Emergency stop rope pull switch GZ2-995 with 3N/C contacts, located along the pulper feed conveyor vat
- Emergency stop local acknowledge push button with indication light, 120HSI-995A/B
- Emergency stop relay (located in MCC)
- VFD for motor 120E-001-M1
- VFD for motor 120E-002-M1

- VFD for motor 120E-003-M1
- Motor contactors for the pulper rotor
- Motor contactors for the pulper pump

Other equipment or functions connected to the E-stop group according to valid risk assessment

User interface

The status information of each of the emergency stop buttons and relays (=E-stop group) are shown on the DCS display. The emergency stop can be activated only from the field by using the emergency stop button or rope pull switches. The emergency stop can be acknowledged only from the field after each of the individual emergency stop switches are in healthy condition.

The control desk 120CD-001 shall be installed at a safe place with good visibility over the control zone to ensure that no-one is in hazardous position during operation.

4 REFERENCES TO OTHER DOCUMENTS

Documents that are referred to in this document is presented in Table 6

Table 6 References to other documents

Document	Document no.
Process Flow sheet	KSDM160095102
Safety of machinery - Electrical equipment of machines - Part 1: General requirements	IEC 60204-1
Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	EN ISO 13849-1

5 Revision history
The revision history for the document is presented in the table below.

Table 7 Revision history

Rev	Change information	Introduced	Signature
01			
02			
03			
0			

5 FUNCTIONS AND INTERLOCKS FOR THE BALE HANDLING

5.1.1 Definition of Terms

Loop and Valve Number

Loop identification number.

Process Function

A brief description of the loop operation

Point of Control

Whether DCS or local control.

Graphic Display

Title of graphic display

Permissive

A signal required that allows the equipment to be started. Once the equipment is in operation it will continue to operate even if the permissive signal is lost. This signal is required in all control modes unless stated otherwise.

Interlocks

A signal required to start and to continue to operate equipment. Without the interlock signal the equipment will not operate. The equipment will stop operating if it is operating when the signal is lost. This signal is required in all control modes unless stated otherwise.

Manual Mode

Description of manual operation requirements. The equipment must be selected in MANUAL for this operation.

Auto Mode

Description of automatic operation requirements. The equipment must be selected in AUTOMATIC for this operation.

Remote Function

Description of cascade operation requirements or when controlled by a remotely calculated set point. The equipment must be selected in REMOTE for this operation.

Indication

Definition of device status indications and location of indications.

Interlock limits

Definition of interlock requirements.

Alarms

Definition of alarm requirements

5.1.2 De-wiring conveyor 120E-001

Motor Number

120E-001M1

Process Function

The bales are being de wired on the conveyor before going to storage conveyer. The conveyors can run in forward and reverse mode: reverse mode is not accessible from DCS station.

Point of Control

DCS and Local operation

Graphic Display

Bale Handling System graphic, X.X

Permissive's

None

Interlocks

The conveyer will stop/cannot start:

-Lifting beam 120HS-004 is in upper position.

-The de-wiring conveyor cannot be run backwards if Local/Remote switch 120HS1-002 is in LOCAL AND control switch Forward/Reverse 120HS2-002 is selected in reverse AND bale limit switch 120GS1-002 is activated.

-The 120GS2-002 is activated, and storage conveyor not running.

-Emergency stop 120HZ-995 tripped, all e stops buttons and pull rope switches

Local Mode

The conveyor can be run in forward and reverse by the operator at the conveyor, local panel by switch 120HS2-002

Manual Mode

No DCS only manual mode

Auto Mode

The conveyer is started, in forward mode only, and by switch 120GS1-002 active

and fork lift presence sensor 120GS1-001 not activated.

The conveyor will run for xx seconds then stop as a part of conveyor loading operation.

The conveyor will also be a part of the conveyor transfer sequence.

Indication

Standard motor display.

5.1.3 Storage conveyor 120E-002

Motor Number

120E-002M1

Process Function

A set of bales is received from the de-wiring conveyor 120E-001. When the first bale in the set reaches the stop position
120GS2-003 the storage conveyor motor 120E-002-M1 will stop. The feeding from the de-wiring conveyor is then also stopped.

When the pulper feed conveyor is ready to receive bales the storage conveyor will feed all bales to the pulper feed conveyor.

When no bale has reached the limit switch 120GS2-003 within a preset time [timer #4] the conveyor is considered empty and a new set of bales can be received from the de-wiring conveyor.

Point of Control

Local and remote operation

Graphic Display

Bale Handling System graphic, X.X

Interlocks

The conveyer will stop cannot start:

-Emergency stop 120HZ-995 tripped, all e stops buttons and pull rope switches

Local Mode

The conveyor can be run in forward and in reverse by the operator at the conveyor, local panel with switch 120HS2-003.

Manual Mode

No DCS only manual mode

Auto Mode

The conveyor will start and stop in the conveyor sequence.

Indication

Standard motor display.

5.1.4 Pulper feed conveyor 120E-003

Motor Number

120E-003M1

Process Function

The conveyor transports bales from the storage conveyer to the bale pulper 121E-001. One set of bales is received from the storage conveyor 120E-002. When the first bale in the batch reaches the stop position 120GS2-007 the pulper feed conveyor motor 120E-003-M1 will stop. The feeding from the storage conveyor is then also stopped.

When a second set of bales is ready on the storage conveyor the batch is complete and ready to be fed into the pulper. At this point the total weight of all bales standing on the storage conveyor 120E-002 and pulper feed conveyor 120E-003 is registered.

When the pulper is ready to receive bales (pulper interlock is deactivated) the pulper feeding sequence starts and the pulper feed conveyor will start feeding all bales into the pulper. This is done by running the pulper feed conveyors at a slow continuous speed.

When no bale has reached the photocell 120GS2-007 within a preset time [timer #5] the conveyor is considered empty and the next set of bales can be received from the storage conveyor. When the bales reach photocell 120GS2-007, the bales will be fed into the pulper at reduced conveyor speed and without delay.

Point of Control

Local and remote operation

Graphic Display

Bale Handling System graphic, X.X

Interlocks

The conveyer will stop cannot start:

- The pulper feed conveyor cannot be run backwards if Local/Remote switch 120HS1-007 is in LOCAL AND control switch Forward/Reverse 120HS2-007 is selected in reverse AND bale limit switch 120GS1-007 is activated.
- Emergency stop 120HZ-995 tripped, all e stops buttons and pull rope switches.
- The pulper feed conveyor cannot be run forward if pulper level 121LI-001 not OK and bale limit switch GS2-007 is activated.

Local Mode

The conveyor can be run in forward and in reverse by the operator at the conveyor, local panel with switch 120HS2-007

Manual Mode

No DCS manual mode

Auto Mode

The conveyor will start and stop in the storage conveyor sequence and bale pulper sequence.

Indication

Standard motor display.

5.1.5 Bale release sensor - 120GS-001

Loop Number

120GS-001 - DI

Process Function

A bale release sensor 120GS-001 prevents the de wiring conveyor from starting if the stack is not lifted.

Point of Indication

No indication

Graphic Display

No System graphic

Indication

Green when activated

5.1.6 De wiring conveyor Bale loading position at inlet end 120GS1-002

Loop Number

120GS1-002 - DI

Process Function

The switch is activated when a bale is placed on the de wiring conveyor at the loading zone,

Point of Control

The signal is activated when the bale is placed on top of the switch

Graphic Display

No graphic,

Indication

Green when activated

5.1.7 De-wiring conveyor Bale loading position at outlet end - 120GS2-002

Loop Number

120GS2-002

Process Function

The loop indicates when the de wiring conveyor is full. When the first bale reaches the switch the de wiring conveyor 120E-001-M1 stops and it is not possible to put on more bales.

Point of Control

The signal is activated when the bale is on top of the switch

Graphic Display

Bale Handling System graphic, X.X

Indication

Green when activated

5.1.8 De-wiring conveyor remote/local selector switch – 120HS1-002A and 120HS1-002B

Loop Number

120HS1-002A – DI

120HS1-002B - DI

Process Function

The de-wiring desk remote/local switch allows the operator to change the state of the de wiring conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-001 Remote mode

Selector Switch position left, conveyor 120E-001 Local mode

Point of control

Control desk CD001, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS”DE-WIRING IN LOCAL”

5.1.9 De-wiring conveyer forward / reverse selector switch 120HS2-002A/B

Loop Number

120HS2-002A -DI

120HS2-002B -DI

Process Function

The de-wiring conveyor “forward” selector allows the operator at the control desk 120CD-001 to drive the de-wiring conveyor forward: the de-wiring conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-002.

The de-wiring conveyor “reverse” selector allows the operator at the control desk 120CD-001 to drive the de-wiring conveyor in reverse: the de-wiring conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS1-002.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-002B.

Selector Switch position right, Conveyor 120E-001 Forward

Selector Switch position left, Conveyor 120E-001 Reverse

Point of Control

De-wiring/pulp conveyor control desk 120CD-001

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.10 De wiring complete SW illuminated push button 120HSI1-002A/B

Loop Number

120HSI1-002A – DI - Button

120HSI1-002B – DI - Light

Process Function

The de-wiring complete SW button is activated by the operator when all bales of SW are loaded and de wired on the conveyor. The push button will flash for 5 seconds and the operator needs to confirm selection by pushing the button once more with in this time. The light will illuminate solid and the signal will indicate in the DCS that the batch is ready to be fed on to the pulp conveyor by the conveyor sequence.

Point of Control

De-wiring/pulp conveyor control desk 120CD-001

Graphic Display

Bale handling system graphic 1.1

Indication

“De wiring complete SW” is shown

5.1.11 Storage conveyor at inlet end 120GS1-003

Loop Number

120GS1-003 - DI

Process Function

The switch is activated when a bale is passing

Point of Control

The signal is activated when the bale is placed on top of the switch

Graphic Display

No graphic,

Indication

Green when activated

5.1.12 Storage conveyer Bale loading position at outlet end - 120GS2-003

Loop Number

120GS2-003

Process Function

The loop indicates when the storage conveyor is full. When the first bale reaches the switch the storage conveyor 120E-002-M1 stops and it is not possible to put on more bales.

Point of Control

The signal is activated when the bale is on top of the switch

Graphic Display

Bale Handling System graphic, X.X

Indication

Green when activated

5.1.13 Storage conveyor remote/local selector switch – 120HS1-003A and 120HS1-003B

Loop Number

120HS1-003A – DI

120HS1-003B - DI

Process Function

The control desk CD01 remote/local switch allows the operator to change the state of the storage conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-002 Remote mode

Selector Switch position left, conveyor 120E-002 Local mode

Point of control

Control desk CD01, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS ”STORAGE IN LOCAL”

5.1.14 Storage conveyer forward / reverse selector switch 120HS2-003A/ 120HS2-003B

Loop Number

120HS2-003A -DI

120HS2-003B -DI

Process Function

The storage conveyor “forward” selector allows the operator at the control desk 120CD-001 to drive the storage conveyor forward: the storage conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-003.

The storage conveyor “reverse” selector allows the operator at the control desk 120CD-001 to drive the storage conveyor in reverse: the storage conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS1-003.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-003B.

Selector Switch position right, Conveyor 120E-002 Forward

Selector Switch position left, Conveyor 120E-002Reverse

Point of Control

Control desk 120CD-001

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.15 Lifting beam selector switch 120HS1-004A/B

Loop Number

120HS1-004A - DI

Process Function

The de-wiring conveyor lifting beam selector switch 120HS1-004A/B allows the operator at the control desk 120CD-001 to raise and lower the beam. The selector switch is activating solenoid valve 120HSV1-004A(up)and 120HSV1-004B(down). This button operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-002B.

Selector Switch position right, lifting beam up

Selector Switch position left, lifting beam down

Point of Control

De-wiring/pulp conveyor control desk 120CD-001

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.16 Lifting beam up 120HSV1-004A

Loop Number

120HSV1-004A

Process Function

The lifting beam up solenoid valve is used to raise the de-wiring beam to upper position so the operator can de-wire the bales easier.

Point of control

Only local control at 12OCD-001

Point of Indication

No local indication

Graphic Display

No System graphic,

Indication

Standard indication

5.1.17 Lifting beam down 120HSV1-004B

Loop Number

120HSV1-004B

Process Function

The lifting beam down solenoid valve is used to lower the de-wiring beam to lower position after the operator have de-wire the bales.

Point of control

Only local control at 12OCD-001

Point of Indication

No local indication

Graphic Display

No System graphic,

Indication

Standard indication

5.1.18 Pulper feed conveyor Reverse interlock sensor 120GS1-007

Loop Number

120GS1-007 - DI

Process Function

The pulper feed conveyor cannot be run backwards if LOCAL control 120HS-007 is selected AND reverse interlocking sensor 120GS1-007 is activated, this is to prevent bales reversing onto the storage conveyor when the pulper feed conveyor is in reverse.

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, xx

Indication

Green when activated

5.1.19 Pulper feed conveyor loaded switch 120GS2-007

Loop Number

120GS2-007 - DI

Process Function

The loop indicates if any bales are at the top of the pulper feed conveyor. When the first bale reaches the switch the pulper feed conveyor 120E-003M1 stops.

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, xx

Indication

Green when activated

5.1.20 Pulper feed conveyor remote/local switch – 120HS1-007A/120HS1-007B

Loop Number

120HS1-007A – DI

120HS1-007B - DI

Process Function

The conveyor control desk CD001 remote/local switch allows the operator to change the state of the pulper feed conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-003 Remote mode

Selector Switch position left, conveyor 120E-003 Local mode

Point of control

Control desk 120CD-001, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS ”LOADING IN LOCAL”

5.1.21 Pulper feed conveyer forward / reverse switch 120HS2-007A/120HS2-007B

Loop Number

120HS2-007A -DI

120HS2-007B -DI

Process Function

The pulper feed conveyor “forward” selector allows the operator at the control desk 120CD-001 to drive the pulper feed conveyor forward: the pulper feed conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-007.

The pulper feed conveyor “reverse” selector allows the operator at the control desk 120CD-001 to drive the feed conveyor in reverse: the feed conveyor will run as long the signal is maintained providing it is not stopped by an interlock (see 6.1.4) or switch 120GS1-007.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-007B.

Selector Switch position right, Conveyor 120E-003 Forward

Selector Switch position left, Conveyor 120E-003 Reverse

Point of Control

De-wiring/pulp conveyor control desk 120CD-001

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.22 Audio alarm “pre warning conveyors start” – 120XI-015

Loop Number

120XI-015 - DO

Process Function

Before start of conveyor movement, the alarm horn gives a 5 second signal to inform operators that movement will start shortly. The controls should be set to REMOTE mode and the pulper feed system should be loaded with bales. This is a part of conveyor sequence.

Point of control

No control in DCS

Graphic Display

No display

Indication

No indication

5.1.23 Load SW de wiring conveyor A 120XI-017

Loop Number

120XI-017 - DO

Process Function

A fixed green light is lit when the pulper feed system is running in REMOTE mode and softwood bale loading is allowed.

A flashing green light is lit when the de wiring conveyor has received a full batch of bales and de wiring can be performed safely

Point of control

No control in DCS

Graphic Display

No display

Indication

No indication

5.1.24 Light indicator “Conv. Busy”120XI-019

Loop Number

120XI-019 - DO

Process Function

A fixed red light is illuminated when the conveyor 120E-002 is busy, i.e. the conveyor is running, the conveyor is set to LOCAL mode or that the production is stopped. This means that bale loading is forbidden if:

- Transferring sequence ongoing conveyor 120E-001
- Transferring sequence ongoing conveyor 120E-002

Point of control

No control in DCS

Graphic Display

NA

Indication

NA

5.1.25 Weighing system – 120WI-010

Loop Number

120WI-010 – No I/O

Process Function

The loop collects data from six weight cells on the pulper feed conveyor the weight of the bales are used for calculating the correct amount of water to be added in the pulper.

The weighing system with eight weigh modules (load cells) is shown in Figure 3 and described in Table 3.

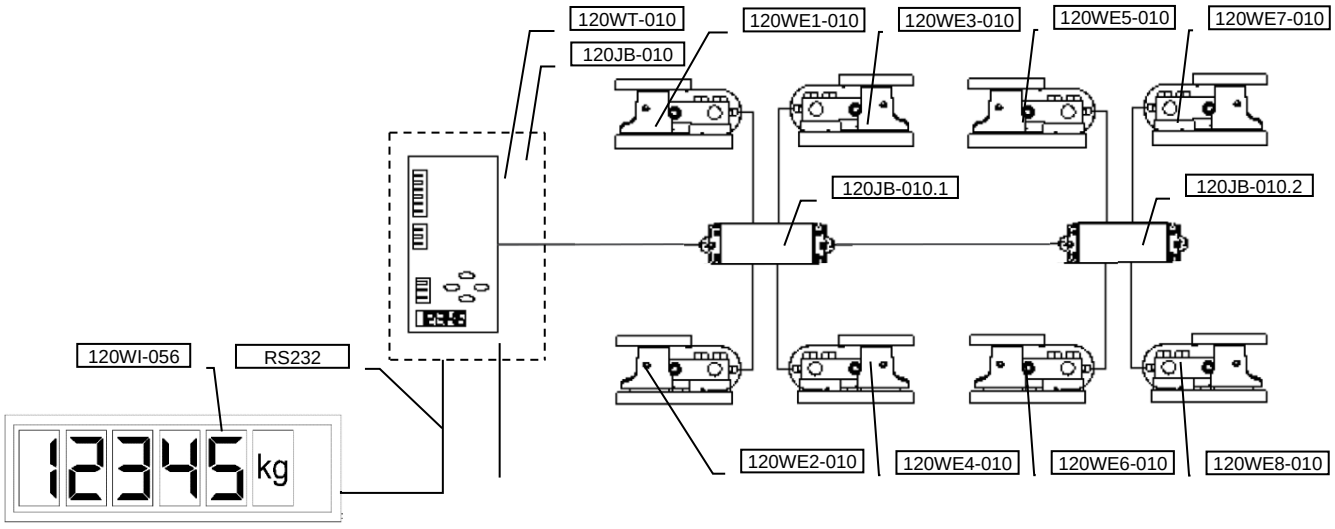


Figure 6 Weighing system with eight load cells

Table 3 Description of the weighing system

Standard Item/Tag	Customer Item/Tag	Device	Function
120WI-010		**External display**	**Large display to visualize the loaded weight for the operator**
120WT-010		**Weighing terminal**	**Weighing terminal with weight indication**

120JB-010		**Junction box**	**Junction box for the weighing terminal**
120JB-010.1		**Load cell junction box #1**	**Precision junction box for multiple load cell connection**
120JB-010.2		**Load cell junction box #2**	**Precision junction box for multiple load cell connection**
120WE1-010		**Load cell #1**	**Load cell for weight registration**
120WE2-010		**Load cell #2**	**Load cell for weight registration**
120WE3-010		**Load cell #3**	**Load cell for weight registration**
120WE4-010		**Load cell #4**	**Load cell for weight registration**
120WE5-010		**Load cell #5**	**Load cell for weight registration**
120WE6-010		**Load cell #6**	**Load cell for weight registration**
120WE7-010		**Load cell #7**	**Load cell for weight registration**
120WE8-010		**Load cell #8**	**Load cell for weight registration**

Point of Indication

External local display

Graphic Display

In DCS

Indication

Total weight is showed

5.1.26 Conveyor system control desk 120CD-001

Desk Number

120CD-001

Process Function

To enable operation of the de wiring and pulp conveyor locally

Point of Control

DCs and Local operation

Graphic Display

No display

Local Mode

The de-wiring and pulp conveyor can be operated locally by the operator.

de-wiring and loading

In auto mode the DCS takes over control. The de-wiring and pulp conveyor are controlled by the conveyor sequence.

Indication

NA

6.1.27 Emergency stop bale handling 120HZ1-995

Loop Number

120HZ1-995A

Process Function

Mush room button in control desk CD001

Emergency stop for bale handling system.

When emergency stop is activated at the control desk following will stop

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-003-M1
- Storage conveyor 120E-002-M1
- De-wiring conveyor 120E-001-M1

Reset of emergency stop at local control desk 120CD-001 120HSI-995A

Point of Control

Mush room button in control desk CD001

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.27 De-wiring conveyor rope pull safety switch 120GZ1,2-995

Loop Number

120GZ1,2-995 DIZ

Process Function

A safety rope is mounted on the side of de wiring conveyor, if this is pulled and switch 120GZ1,2-995 is activated the emergency stop will be activated and following will be stopped

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-003-M1
- Storage conveyor 120E-002-M1
- De-wiring conveyor 120E-001-M1

Reset of emergency stop at local control desk 120CD-001 120HZI-995A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.28 Pulper feed conveyor rope pull safety switch 120GZ3,4-995

Loop Number

120GZ3,4-995 DIZ

Process Function

A safety rope is mounted in the roof of the pulper feed conveyor canape, if this is pulled and switch 120GZ3,4-995 is activated the emergency stop will be activated, and following will be stopped

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-003-M1
- Storage conveyor 120E-002-M1
- De-wiring conveyor 120E-001-M1

Reset of emergency stop at local control desk 120CD-001 120HZI-995A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.29 Pulper feed conveyor rope pull safety switch 120GZ5,6-995

Loop Number

120GZ5,6-995 DIZ

Process Function

A safety rope is mounted in the roof of the pulper feed conveyor canape, if this is pulled and switch 120GZ5,6-995 is activated the emergency stop will be activated, and following will be stopped

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-003-M1
- Storage conveyor 120E-002-M1
- De-wiring conveyor 120E-001-M1

Reset of emergency stop at local control desk 120CD-001 120HZI-995A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.30 Emergency stop reset illuminated push button 120HSI-995A/B

Loop Number

120HSI-995A – DI - reset

120HSI-995B – DO – light for emergency stop tripped

Process Function

- If the safety relay has been activated, a reset of the safety relay must be done to restart the pulper feed system. This can be done with the illuminated push button HSI-995A on the local control desk 120CD-001.
- Fixed blue light indicates that the emergency stop relay is possible to reset

Point of Control

Control desk 120CD-001

Graphic Display

Bale handling system graphic 1.1

Indication

Blue light in control desk is shown

5.2 CONVEYOR SEQUENCE

Note that all interlocks are valid all times and will override any Sequence logic where applicable.

Note that the Sequence logic is valid only whilst the Sequence is active but will override any other logic (with exception of interlocks) during that time where applicable.

The start sequence for the conveyor system consist of three types of transferring sequences

1. De wiring to storage
2. Storage to loading
3. Loading sequence for pulper

The concept for starting the sequences is that then system is in auto the conveyor will start if the next conveyor is empty.

First batch

- Load de wiring conveyor and de wire and leave the safety zone
- The operator now pushes “de wiring complete SW/HW” 120HSI1-002 or 120HSI2-002 on control desk CD001.

  Now the sequence is ready to start

Sequence permissive

Before being available for selection, the sequence requires the following conditions to be met:

- De wiring conveyor 120E-001 M1 in Remote

- Storage conveyor 120E-002 M1 in Remote
- Pulper feed conveyor 120E-003M1 in Remote
- Signal from “De wiring complete” activated

5.2.1 Start sequence 1

Bales on de wiring conveyor to be moved to end of storage conveyor

Sequence will start if 120GS2-003 bales position in outlet end storage conveyor not activated.

Step 1. START SEQUENCE 1

- Pre warning conveyors start, audible alarm 120XI-015 activates for 5 sec before conveyors start- Timer T4

Before going to next step, the sequence checks following conditions are met:

- End of Timer T4 120XI-015 go off

Step 2. START CONVEYORS

- Start de-wiring conveyor 120E-001M1
- Start storage conveyor 120E-002M1
- Activate visual signal 120XI-019 conveyor system busy

Now one batch transferred from de-wiring conveyor on to the storage conveyor

Before going to next step, the sequence checks following conditions are met:

- De-wiring conveyor 120E-001M1 - RUN
- Storage conveyor 120E-002M1- RUN

Step 3. STOP PRE-WARNING

Before going to next step, the sequence checks following conditions are met:

- Storage conveyor bale loaded in outlet end switch 120GS2-003 to be activated.

Step 4. STOP CONVEYORS

- Stop de-wiring conveyor 120E-001M1
- Stop storage conveyor 120E-002M1
- Indication light 120XI-019 go off

Before going to step 1 the sequence checks following conditions are met:

- De-wiring conveyor 120E-001M1 - Stop
- Storage conveyor 120E-002M1- Stop

One batch is now waiting to be feed over to the pulper feed conveyor, now the operator can load and de wire a new batch.

5.2.2 Start sequence 2

Bales from storage conveyor to be moved to pulper feed conveyor.

Sequence will start if 120GS2-007 not activated by bales in upper position.

Step 1. START SEQUENCE 2

- Pre warning conveyors start, audible alarm 120XI-015 activates for 5 sec before conveyors start- Timer T1

Before going to next step, the sequence checks following conditions are met:

- End of Timer T1 120ZXI-015 go off

Step 2. START CONVEYORS

- Start Storage conveyor 120E-002M1
- Start pulper feed conveyor 120E-003M1
- Activate visual signal 120XI-019 conveyor system A busy

Now one batch is going of the storage and up on the pulper feed conveyor

Before going to next step, the sequence checks following conditions are met:

- Storage conveyor 120E-002M1 - RUN
- Pulper feed conveyor 120E-003M1- RUN

Step 3. STOP PRE-WARNING

Before going to next step, the sequence checks following conditions are met:

- Pulper feed conveyor bale loaded in outlet end switch 120GS2-007 to be activated.

Step 4. STOP CONVEYORS

- Stop storage conveyor 120E-002M1
- Stop pulper feed conveyor 120E-003M1
- Indication light 120XI-019 go off

Before going to step 1 the sequence checks following conditions are met:

- Storage conveyor 120E-002M1 - Stop
- Pulper feed conveyor 120E-003M1- Stop

5.2.3 Start sequence 3

Bales on pulper feed conveyor to be entering the pulper

Sequence 3 will start when signal is activated from pulper sequence

This will be a part of the pulper sequence.

1.1 BALE HANDLING JUPITER SW LINE

						APPROVALS		
Issue	**Date**	**Pages**	**Issue Description**			**By**	**Check**	**Approve**
00	20-09-17		Preliminary			NOM	FKC	
■	Entire Specification Issued this Revision		SPECIFICATION ISSUED FOR:					
			■	Review		☐	Purchase	
☐	Revised Pages Only Issued this Revision		☐	Client Approval		☐	Construction	
			☐	Enquiry		☐		

TABLE OF CONTENTS

1 PURPOSE OF THE FUNCTIONAL DESCRIPTION 1
2 GENERAL 1
3 FUNCTIONAL DESCRIPTION 3
3.1 **GENERAL** 3
3.1.1 Main equipment 3
3.1.2 Electrical equipment and components 4
3.1.3 Weighing system 6
3.1.4 Local controls 7
3.1.5 Indications 9
3.2 **FUNCTIONAL DESCRIPTION OF THE PULPER FEED SYSTEM** 10
3.2.1 General 10
3.2.2 Bale loading and de wiring of bales on de wiring conveyor 120E-101 10
3.2.3 Storage of bales on storage conveyor 120E-102 13
3.2.4 Pulper feeding of bales by pulper feed conveyor 120E-103 14
3.2.5 Local controls 16
3.2.6 Indications 17
3.2.7 Bale handling emergency stops 18
4 REFERENCES TO OTHER DOCUMENTS 21
5 FUNCTIONS AND INTERLOCKS FOR THE BALE HANDLING 22
5.1.1 Definition of Terms 22
5.1.2 De-wiring conveyor 120E-101 24
5.1.3 Storage conveyor 120E-102 26
5.1.4 Pulper feed conveyor 120E-103 28
5.1.5 Bale release sensor - 120GS-101 30
5.1.6 De-wiring conveyor Bale loading position at inlet end 120GS1-102 31
5.1.7 De-wiring conveyor Bale loading position at outlet end - 120GS2-102 32
5.1.8 De-wiring conveyor remote/local selector switch – 120HS1-102A and 120HS1-102B 33
5.1.9 De-wiring conveyer forward / reverse selector switch 120HS2-102A/B 34
5.1.10 De wiring complete SW illuminated push button 120HSI1-102A/B 35
5.1.11 Storage conveyor at inlet end 120GS1-103 36
5.1.12 Storage conveyer Bale loading position at outlet end - 120GS2-103 37
5.1.13 Storage conveyor remote/local selector switch – 120HS1-103A and 120HS1-103B 38
5.1.14 Storage conveyer forward / reverse selector switch 120HS2-103A/ 120HS2-103B 39
5.1.15 Lifting beam selector switch 120HS1-104A/B 40
5.1.16 Lifting beam up 120HSV1-104A 41
5.1.17 Lifting beam down 120HSV1-104B 42
5.1.18 Pulper feed conveyor Reverse interlock sensor 120GS1-107 43
5.1.19 Pulper feed conveyor loaded switch 120GS2-107 44
5.1.20 Pulper feed conveyor remote/local switch – 120HS1-107A/120HS1-107B 45
5.1.21 Pulper feed conveyer forward / reverse switch 120HS2-107A/120HS2-107B 46
5.1.22 Audio alarm "pre warning conveyors start" – 120XI-115 47
5.1.23 Load SW de wiring conveyor A 120XI-117 48
5.1.24 Light indicator "Conv. Busy"120XI-119 49
5.1.25 Weighing system – 120WI-110 50
5.1.26 Conveyor system control desk 120CD-003 52
5.1.27 Emergency stop bale handling 120HZ1-996 53
5.1.28 De wiring conveyor rope pull safety switch 120GZ1,2-996 54

5.1.29 Pulper feed conveyor rope pull safety switch 120GZ3,4-996 55
5.1.30 Pulper feed conveyor rope pull safety switch 120GZ5,6-996 56
5.1.31 Emergency stop reset illuminated push button 120HSI-996A/B 57
5.2 CONVEYOR SEQUENCE 58
5.2.1 Start sequence 1 59
5.2.2 Start sequence 2 61
5.2.3 Start sequence 3 63

1 PURPOSE OF THE FUNCTIONAL DESCRIPTION

The purpose of this document is to give a general view of the function of the equipment included in the delivery from Valmet.

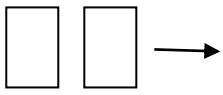
The functional description is to be used by electrical designers, programmers of the automation system as well as process operators.

Only process functions and interlocks are described in this function description. Basic MCC interlocks, MCC faults, measurement faults, valve position monitoring and other common standard functions that are applied to all zones are not described in this function description. Only if exceptions are needed, they will be mentioned case by case in this description.

2 GENERAL

The bale handling system brings virgin pulp bales from the pulp yard to the pulper for slushing in a batch sequence. The system consists of a de-wiring conveyor of type MDB, a storage conveyor and a pulper feed conveyor of type CHB-FD.

The bales are loaded as stacks of bales by a forklift truck. The bales are oriented with the long side in the conveyor transport direction.



De stacking is done on the de-wiring conveyor by the forklift operator following the signals on the indicator bank. As many bales as required in the batch are loaded onto the conveyor. The de-wiring conveyor cannot take the whole batch so the de-wiring must be done in two sequences.

When the first set of bales have been loaded the operator lifts all bales with a lifting beam integrated in the conveyor. The bale wires are then manually cut and removed by hand.
A second set of bales are thereafter loaded and de-wired. When de-wiring is completed the operator lowers the bales onto the conveyor chains and acknowledges the completion of the de-wiring sequence. The bales then continue to the intermediate storage conveyor.

The final batch of bales standing on the pulper feed conveyor and the storage conveyor is weighed all together and brought to the pulper inlet chute for slushing.

3 FUNCTIONAL DESCRIPTION

3.1 GENERAL

3.1.1 Main equipment

Main equipment included in the pulper feed system are shown in Figure 1 and described in Table 1.

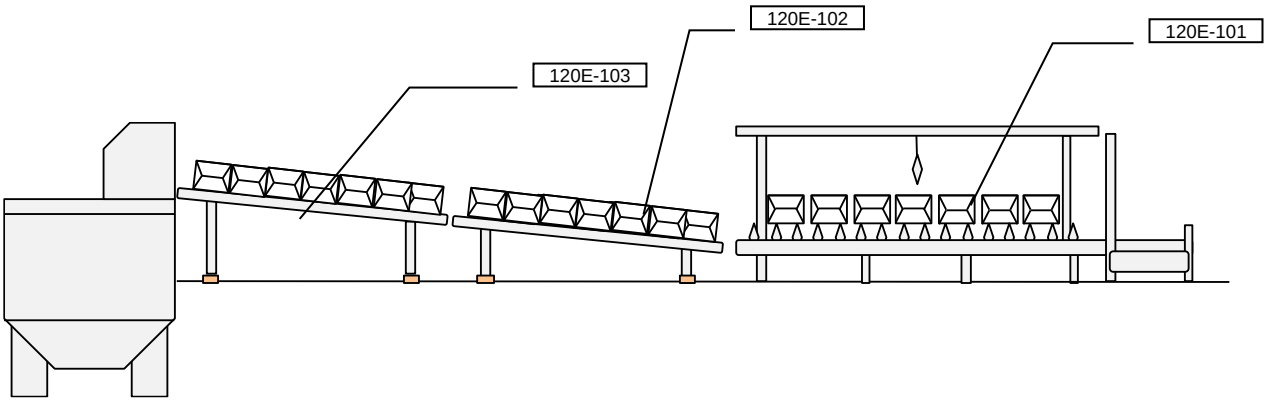


Figure 1 Main equipment included in the pulper feed system

Table 1 Description of main equipment in the pulper feed system

Standard Item/Tag	Function	Description
120E-101	De-wiring of bales	Manual de-wiring conveyor, type MDB3015H07-L Conveying speed 0.1 - 0.3 m/s (VFD)
120E-102	Intermediate storage of bales	Storage conveyor, type CHB370-FD Conveying speed 0.1 - 0.3 m/s (VFD)
120E-103	Pulper feeding of bales	Storage conveyor, type CHB370-FD Conveying speed 0.1 - 0.3 m/s (VFD)

3.1.2 Electrical equipment and components

Electrical equipment and components are shown in Figure 2 and described in Table 2.

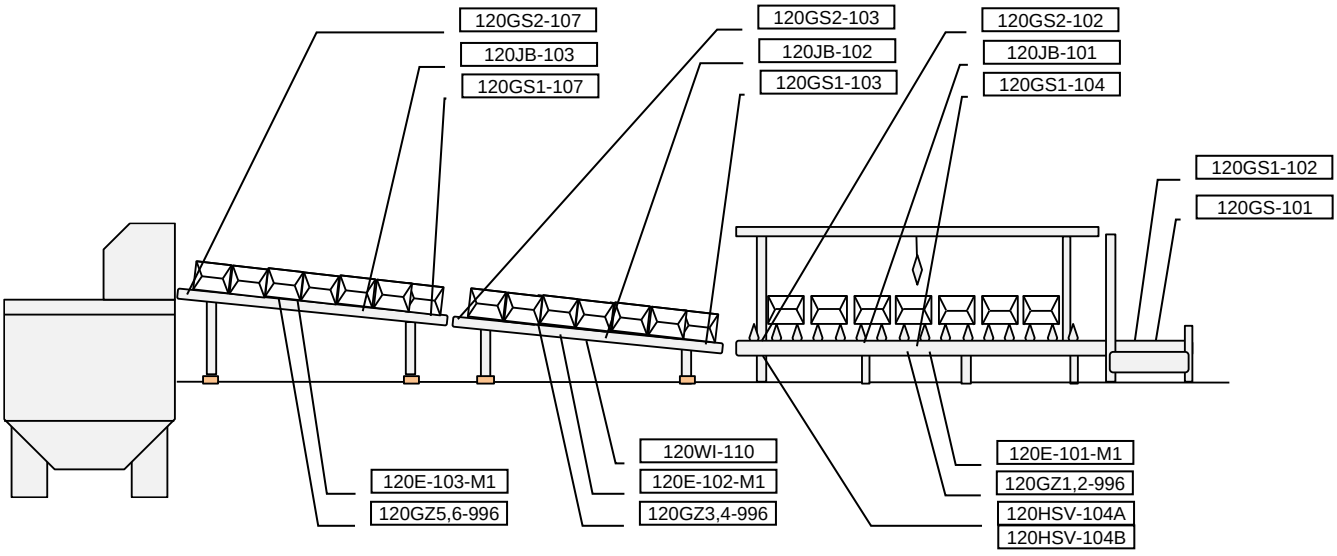


Figure 2 Electrical equipment and components included in the pulper feed system

Table 2 Description of electrical components included in the pulper feed system

Item/Tag	Device	Function
120E-101-M1	Motor	Electrical gear motor for de-wiring conveyor
120JB-101	Junction box	Junction box for conveyor
120GS-101	Photocell	Bale release sensor
120GS1-102	Limit switch	Bale loading position at inlet end
120GS2-102	Limit switch	Bale stop position at outlet end
120GS1-104	Limit switch	Lifting beam in lower position
120HSV-104A	Pneumatic valve – coil 14	Lifting beam up
120HSV-104B	Pneumatic valve – coil 12	Lifting beam down
120GZ1,2-996	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120E-102-M1	Motor with brake	Electrical gear motor with brake for storage conveyor
120JB-102	Junction box	Junction box for conveyor

Item/Tag	Device	Function
120GS1-103	Limit switch	Bale loading position at inlet end
120GS2-103	Limit switch	Bale stop position at outlet end
120GZ3,4-996	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120GS1-107	Limit switch	Bale loading position at inlet end
120GS2-107	Photocell	Bale stop position at outlet end
120GZ5,6-996	Rope pull safety switch	Emergency stop (One rope pull switch on each conveyor side)
120E-103-M1	Motor with brake	Electrical gear motor with brake for storage conveyor
120JB-103	Junction box	Junction box for conveyor
120WI-110	Weighing system	Batch weight

3.1.3 Weighing system

The weighing system is shown in Figure 3 and described in Table 3.

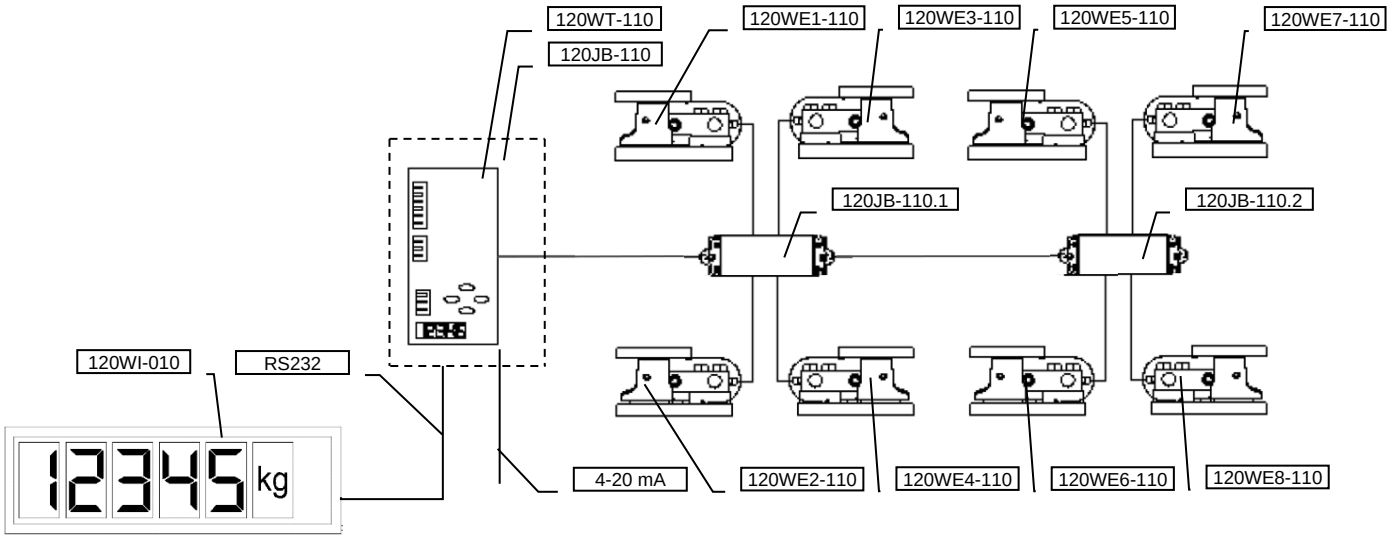


Figure 3 Weighing system with eight load cells

Table 3 Description of the weighing system

Customer Item/Tag	Device	Function
120WI-110	External display	Large display to visualize the loaded weight for the operator
120WT-110	Weighing terminal	Weighing terminal with weight indication
120JB-110	Junction box	Junction box for the weighing terminal
120JB-110.1	Load cell junction box #1	Precision junction box for multiple load cell connection
120JB-110.2	Load cell junction box #2	Precision junction box for multiple load cell connection
120WE1-110	Load cell #1	Load cell for weight registration
120WE2-110	Load cell #2	Load cell for weight registration
120WE3-110	Load cell #3	Load cell for weight registration
120WE4-110	Load cell #4	Load cell for weight registration
120WE5-110	Load cell #5	Load cell for weight registration
120WE6-110	Load cell #6	Load cell for weight registration
120WE7-110	Load cell #7	Load cell for weight registration
120WE8-110	Load cell #8	Load cell for weight registration

3.1.4 Local controls

Local controls are shown in Figure 4 and described in Table 4.

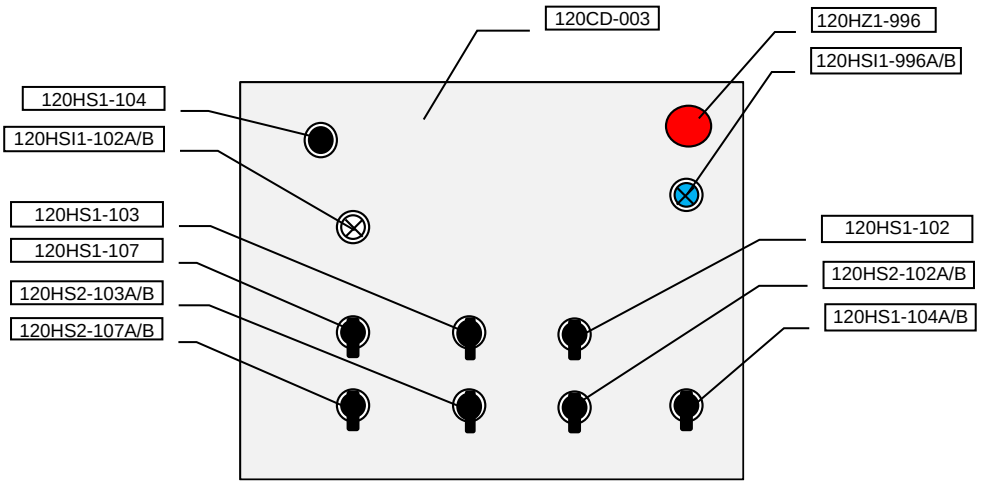


Figure 4 Local controls in the pulper feed system

Table 4 Description of electrical components for control of the pulper feed system

Customer Item/Tag	Device	Function	Color
120CD-003	Control desk	Local control desk for the pulper feed system	-
120HZ1-996	Mushroom push button	Emergency stop	Red
120HSI1-996	Illuminated push button	Emergency stop reset	-
120HSI1-996A	Push button	Reset function	-
120HSI1-996B	Indication lamp	Emergency stop tripped	Blue
120HSI1-102	Illuminated push button	De-wiring completed	-
120HSI1-102A	Push button	De-wiring completed	-
120HSI1-102B	Indication lamp	De-wiring completed acknowledgement	White
120HS1-104	Push button	Hold to run	White
120HS1-104A	Selector Switch position right	Lifting beam up	-
120HS1-104B	Selector Switch position left	Lifting beam down	-

Table continued on next page

Table 4 Continuation from previous page

Customer Item/Tag	Device	Function	
120HS1-102	Selector Switch	Conveyor 120E-001 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-001 Remote mode	-
-	Selector Switch position left	Conveyor 120E-001 Local mode	-
120HS2-102	Selector Switch	Conveyor 120E-001 Forward/0/Reverse operation	Black
120HS2-102A	Selector Switch position right	Conveyor 120E-001 Forward	-
120HS2-102B	Selector Switch position left	Conveyor 120E-001 Reverse	-
120HS1-103	Selector Switch	Conveyor 120E-002 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-002 Remote mode	-
-	Selector Switch position left	Conveyor 120E-002 Local mode	-
120HS2-103	Selector Switch	Conveyor 120E-002 Forward/Reverse operation	Black
120HS2-103A	Selector Switch position right	Conveyor 120E-002 Forward	-
120HS2-103B	Selector Switch position left	Conveyor 120E-002 Reverse	-
120HS1-107	Selector Switch	Conveyor 120E-003 Local/Remote mode	Black
-	Selector Switch position right	Conveyor 120E-003 Remote mode	-
-	Selector Switch position left	Conveyor 120E-003 Local mode	-
120HS2-107	Selector Switch	Conveyor 120E-003 Forward/Reverse operation	Black
120HS2-107A	Selector Switch position right	Conveyor 120E-003 Forward	-
120HS2-107B	Selector Switch position left	Conveyor 120E-003 Reverse	-

3.1.5 Indications

Indications are shown in Figure 5 and described in Table 5.

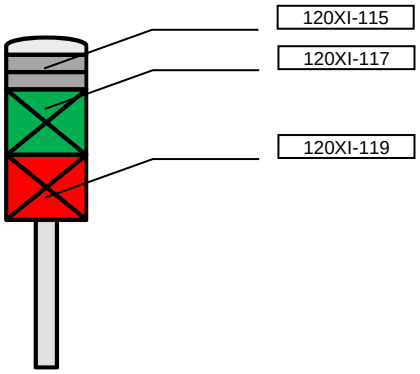


Figure 5 Indicator bank for the de-wiring conveyor

Table 5 Description of the indicator bank for the de-wiring conveyor

Customer Item/Tag	Device	Description	Color
120XI-115	Alarm horn	Auditory signal PRODUCTION START	-
120XI-117	Visual signal	Production started (fixed light) LOAD BALES Loading of bales completed (flashing light) DEWIRE BALES	Green
120XI-119	Visual signal	Loading conveyor full or running / Pulper production stopped (fixed light) CONVEYOR BUSY / PRODUCTION STOP	Red

3.2 FUNCTIONAL DESCRIPTION OF THE PULPER FEED SYSTEM

3.2.1 General

Automation controls are realized by a distributed control system (DCS). The pulping controls are operated from the stock preparation control room or paper machine control room. In addition, there are some local controls which are operated from a local control desk, 120CD-003. The pulper feed system can individually be operated in either remote or local mode. In remote mode the conveyors respond to the manual de-wiring and production demand in accordance with a predefined logic. In local mode it is possible to manually run the conveyors according to specific needs, e.g. during service or cleaning. The following sections give conceptual descriptions of operation in the two different modes.

Process settings, like values for timers and distance between bales are adjustable from the DCS. All settings are behind password.

The functional description foresees the use of variable frequency drive (VFD) on the pulper feed conveyor.

3.2.2 Bale loading and de wiring of bales on de wiring conveyor 120E-101

Function Bale loading and de-wiring

A stack of bales, normally consisting of three or four bales, is loaded onto the de-wiring conveyor 120E-101. Loading is allowed only if the green lamp 120XI-117 is lit.

The forklift driver loads one stack of bales activating limit switch 120GS1-102 located at the loading position of the de-wiring conveyor 120E-101. The forklift driver then takes a new grip and lifts the remaining stack of bales to release the

bottom bale still resting on the conveyor chains. A bale release sensor 120GS-101 prevents the dewiring conveyor from starting if the stack is not lifted.

When a bale is detected on limit switch 120GS1-102 and the bale release sensor is deactivated, the loading conveyor is started after a preset time [timer #1]. The bale is then forwarded to give space to load another bale [timer # 2]. When [timer #2] has run out the conveyor is stopped, and the forklift driver puts down the remaining bales in the vacated position.

When a set of bales (normally 7) have been loaded [counter #1] the green light starts flashing indicating that the de-wiring conveyor is full and that manual de-wiring of the bales can be performed safely. The operator then lifts the batch of bales by pressing and holding the “hold to run” button 120HS1-104 and the use the selector switch 120HS1-104A/B for activating the conveyor lifting beam. The lifting beam can only be lifted if motor 120E-101-M1 is not running. All bales must be positioned within the operating length of the lifting beam before lifting can commence. The bale wires are manually cut and removed by hand. The lift beam is thereafter lowered by using the same pushbutton 120HS1-104 and selector switch 120HS1-104A/B.

The completion of the de-wiring is acknowledged by the operator by pressing the button 120HSI1-102. A white lamp is lit confirming the acknowledgement by the DCS. All bales are then forwarded to the stop position 120GS2-102. If the storage conveyor 120E-102 is ready to receive bales, all bales at the same time will be forwarded from the de-wiring conveyor to the pulper feed conveyor. The speed of the receiving storage conveyor is adjusted to ensure that all bales fit to the available space.
Bales are forwarded only if the storage conveyor is empty and is not interlocked by the pulper feed conveyor.

When no bale has reached the limit switch 120GS2-102 within a preset time [timer #3] the conveyor is considered empty and the conveyor will stop. The white lamp is switched off and a new set of bales of bales can be loaded for de-wiring.

Equipment

The function comprises the following devices:

- Bale limit switch for bale loading position, 120GS1-102
- Bale release sensor, 120GS-101
- Bale limit switch for bale stop position, 120GS2-102
- Limit switch for the lifting beam in lower position, 120GS1-104
- Pneumatic valve for control of the lifting beam up and down, 120HSV-104
- Pushbutton for de-wiring completion acknowledgement, 120HSI1-102
- Pushbutton 120HS1-104 and selector switch 120HS1-104A/B for control of the lifting beam up and down
- Conveyor motor, 120E-101-M1
- VFD for the pulper feed conveyor motor 120E-101-M1

3.2.3 Storage of bales on storage conveyor 120E-102

Function bale storage

The storage conveyor 120E-102 is receiving bales from the de-wiring conveyor 120E-101.

When the first bale in the set reaches the stop position 120GS2-103 the storage conveyor motor 120E-102-M1 will stop. The feeding from the de-wiring conveyor is then also stopped.

When the pulper feed conveyor is ready to receive bales the storage conveyor will feed all bales to the pulper feed conveyor.

When no bale has reached the limit switch 120GS2-103 within a preset time [timer #4] the conveyor is considered empty and a new set of bales can be received from the de-wiring conveyor.

Equipment

The function comprises the following devices:

- Bale limit switch for bale stop position, 120GS2-103
- Motor, 120E-102-M1
- VFD for the pulper feed conveyor motor 120E-102-M1

3.2.4 Pulper feeding of bales by pulper feed conveyor 120E-103

Function Pulper feeding

The pulper feed conveyor 120E-103 is running in batch mode, feeding the pulper with bales.
One set of bales is received from the storage conveyor 120E-102. When the first bale in the batch reaches the stop position 120GS2-107 the pulper feed conveyor motor 120E-103-M1 will stop. The feeding from the storage conveyor is then also stopped.

When a second set of bales is ready on the storage conveyor the batch is complete and ready to be fed into the pulper. At this point the total weight of all bales standing on the storage conveyor 120E-102 and pulper feed conveyor 120E-103 is registered.

When the pulper is ready to receive bales (pulper interlock is deactivated) the pulper feeding sequence starts and the pulper feed conveyor will start feeding all bales into the pulper. This is done by running the pulper feed conveyors at a slow continuous speed.

When no bale has reached the photocell 120GS2-107 within a preset time [timer #5] the conveyor is considered empty and the next set of bales can be received from the storage conveyor. When the bales reach photocell 120GS2-107, the bales will be fed into the pulper at reduced conveyor speed and without delay.

The pulper feed sequence is now ended and a new batch can be de-wired.

Equipment

The function comprises the following devices:

- Bale limit switch for bale inlet position, 120GS2-107
- Bale photocell for bale stop position, 120GS2-107

- Motor, 120E-103-M1
- VFD for the pulper feed conveyor motor 120E-103-M1

3.2.5 Local controls

Conveyor controls from control desk 120CD-003

The local control desk 120CD-003 is equipped with local control switches for manual interaction with each of the conveyors. 120HS1-102 / 120HS1-103 and 120HS1-107 for operating mode selection, having LOCAL and REMOTE positions and 120HS2-102A/B / 120HS2-103A/B and 120HS2-107A/B for FORWARD and REVERSE operation, for each conveyor. In LOCAL mode it is not possible to run the de-wiring conveyor in reverse when bale limit switch 120GS1-102 is activated, the pulper feed conveyor cannot be run forward when bale photocell 120GS2-107 is activated.

Local control switches for de-wiring conveyor 120E-101

The bales are loaded onto the conveyor in REMOTE position. With 120HS1-102 in REMOTE position the pulping sequence (DCS) can start and stop the conveyor. In LOCAL position the operator can run the de-wiring conveyor locally forward and reverse by using switch 120HS2-102A/B, e.g. during failures when loading bales. When selecting LOCAL position from REMOTE position, the conveyor is stopped immediately. The operator selects the REMOTE position when the conveyor can be set back to automatic operation.

120HS1-103 / 120HS2-103A/B and 120HS1-107 / 120HS2-107A/B, local control switches for pulper feed conveyors 120E-102 and 120E-103.
Same function as for 120E-101

Lifting beam controls

See section 4.2.2

Emergency stop controls

See section 4.2.7

3.2.6 Indications

Indicator bank for the de wiring conveyor 120E-101

Function Loading of bales

The indicator bank located by the de-wiring conveyor is equipped with auditory and visual signals for operational guidance.

Auditory signal, 120XI-115
Before start of production the alarm horn gives a 5 second signal to inform operators that production will start shortly. The controls should then be set to REMOTE mode and the pulper feed system should be loaded with bales.

Visual signal, 120XI-117
A fixed green light is lit when the pulper feed system is running in REMOTE mode. This means that bale loading is allowed.

A flashing green light is lit when the de-wiring conveyor has received a full set of bales and de-wiring can be performed safely.

Visual signal, 120XI-119
A fixed red light is lit when the conveyor 120E-101 is busy, i.e. the conveyor is running, the conveyor is set to LOCAL mode or that the production is stopped. This means that bale loading is forbidden.

3.2.7 Bale handling emergency stops

General functions

The emergency stop input functions 120HZ1-996, 120GZ1-996, 120GZ2-996…. 120GZ6-996 are used for immediate stopping of the pulper feed system including pulper rotor and pump in case of emergency. All hazardous equipment in all lines shall be stopped from one emergency stop if several pulpers and pulper feed lines are present in same building.

The input functions are hardwired to a safety monitoring system (with relays or safety PLC) which will stop the pulping lines if any of the safety functions are activated.

The contact state of each of the emergency stop switches is wired to the safety monitoring system. The safety monitoring system can then forward the information to the DCS about which stop function that has been activated.

Emergency stop functions

If a safety function is activated, the safety relay initiates a shutdown of the contactor relay operation according to stop category 0 in compliance with EN 60204-1. This is done by switching off the control voltage to the contactor which will stop the motor circuit (hardwired and software interlock).

For the VFD controlled motors the Safe Torque Off (STO) function is used to stop the motor.

The emergency stop button does not affect the pneumatic valve on the de-wiring conveyor.

Emergency stop reset functions

If the safety relay has been activated, a reset of the safety relay must be done to restart the pulper feed system. This can be done with the illuminated push button 120HSI1-996A/B on the local control desk 120CD-003.

The relay monitors whether the contacts of the safety functions are closed, that all contactors are switched off and that the VFD has been brought to a stop with the following indications possible:

- Fixed blue light indicates that the emergency stop relay is possible to reset.
- Flashing blue light indicates that the safety relay is not possible to reset, i.e. that one or several emergencies stop functions still are active or that a fault has been detected.

Safety performance

The minimum required performance level for all safety functions is PL c according to ISO 13849-1.

Equipment

- The function comprises the following devices in the pulper feed system:
- Emergency stop button 120HZ1-996 with 3N/C contacts
- Emergency stop rope pull switch GZ1-996 with 3N/C contacts, located along the de-wiring conveyor chain beam
- Emergency stop rope pull switch GZ2-996 with 3N/C contacts, located along the pulper feed conveyor vat
- Emergency stop local acknowledge push button with indication light, 120HSI-996A/B
- Emergency stop relay (located in MCC)
- VFD for motor 120E-101-M1
- VFD for motor 120E-102-M1

- VFD for motor 120E-103-M1
- Motor contactors for the pulper rotor
- Motor contactors for the pulper pump

Other equipment or functions connected to the E-stop group according to valid risk assessment

User interface

The status information of each of the emergency stop buttons and relays (=E-stop group) are shown on the DCS display. The emergency stop can be activated only from the field by using the emergency stop button or rope pull switches. The emergency stop can be acknowledged only from the field after each of the individual emergency stop switches are in healthy condition.

The control desk 120CD-001 shall be installed at a safe place with good visibility over the control zone to ensure that no-one is in hazardous position during operation.

4 REFERENCES TO OTHER DOCUMENTS

Documents that are referred to in this document is presented in Table 6

Table 6 References to other documents

Document	Document no.
Process Flow sheet	KSDM160095102
Safety of machinery - Electrical equipment of machines - Part 1: General requirements	IEC 60204-1
Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	EN ISO 13849-1

5 FUNCTIONS AND INTERLOCKS FOR THE BALE HANDLING

5.1.1 Definition of Terms

Loop and Valve Number

Loop identification number.

Process Function

A brief description of the loop operation

Point of Control

Whether DCS or local control.

Graphic Display

Title of graphic display

Permissive

A signal required that allows the equipment to be started. Once the equipment is in operation it will continue to operate even if the permissive signal is lost. This signal is required in all control modes unless stated otherwise.

Interlocks

A signal required to start and to continue to operate equipment. Without the interlock signal the equipment will not operate. The equipment will stop operating if it is operating when the signal is lost. This signal is required in all control modes unless stated otherwise.

Manual Mode

Description of manual operation requirements. The equipment must be selected in MANUAL for this operation.

Auto Mode

Description of automatic operation requirements. The equipment must be selected in AUTOMATIC for this operation.

Remote Function

Description of cascade operation requirements or when controlled by a remotely calculated set point. The equipment must be selected in REMOTE for this operation.

Indication

Definition of device status indications and location of indications.

Interlock limits

Definition of interlock requirements.

Alarms

Definition of alarm requirements

5.1.2 De-wiring conveyor 120E-101

Motor Number

120E-101M1

Process Function

The bales are being de wired on the conveyor before going to storage conveyer. The conveyors can run in forward and reverse mode: reverse mode is not accessible from DCS station.

Point of Control

DCS and Local operation

Graphic Display

Bale Handling System graphic, X.X

Permissive's

None

Interlocks

The conveyer will stop/cannot start:

-Lifting beam 120HS-104 is in upper position.

-The de-wiring conveyor cannot be run backwards if Local/Remote switch 120HS1-102 is in LOCAL AND control switch Forward/Reverse 120HS2-102 is selected in reverse AND bale limit switch 120GS1-102 is activated.

-Bale release sensor 120GS-101 is activated

-Emergency stop 120HZ1-996 tripped, all e stops buttons and pull rope switches

Local Mode

The conveyor can be run in forward and reverse by the operator at the conveyor, local panel by switch 120HS2-102

Manual Mode

No DCS only manual mode

Auto Mode

The conveyer is started, in forward mode only, and by switch 120GS1-102 active

and fork lift presence sensor 120GS1-101 not activated.

The conveyor will run for xx seconds then stop as a part of conveyor loading operation.

Indication

Standard motor display.

5.1.3 Storage conveyor 120E-102

Motor Number

120E-102M1

Process Function

A set of bales is received from the de-wiring conveyor 120E-101. When the first bale in the set reaches the stop position
120GS2-103 the storage conveyor motor 120E-102-M1 will stop. The feeding from the de-wiring conveyor is then also stopped.

When the pulper feed conveyor is ready to receive bales the storage conveyor will feed all bales to the pulper feed conveyor.

When no bale has reached the limit switch 120GS2-103 within a preset time [timer #4] the conveyor is considered empty and a new set of bales can be received from the de-wiring conveyor.

Point of Control

Local and remote operation

Graphic Display

Bale Handling System graphic, X.X

Interlocks

-Emergency stop 120HZ1-996 tripped, all e stops buttons and pull rope switches

Local Mode

The conveyor can be run in forward and in reverse by the operator at the conveyor, local panel with switch 120HS2-103

Manual Mode

No DCS only manual mode

Auto Mode

Indication

Standard motor display.

5.1.4 Pulper feed conveyor 120E-103

Motor Number

120E-103M1

Process Function

The pulper feed conveyor 120E-103 is running in batch mode, feeding the pulper with bales.

One set of bales is received from the storage conveyor 120E-102. When the first bale in the batch reaches the stop position 120GS2-107 the pulper feed conveyor motor 120E-103-M1 will stop. The feeding from the storage conveyor is then also stopped.

When a second set of bales is ready on the storage conveyor the batch is complete and ready to be fed into the pulper. At this point the total weight of all bales standing on the storage conveyor 120E-102 and pulper feed conveyor 120E-103 is registered.

When the pulper is ready to receive bales (pulper interlock is deactivated) the pulper feeding sequence starts and the pulper feed conveyor will start feeding all bales into the pulper. This is done by running the pulper feed conveyors at a slow continuous speed.

When no bale has reached the photocell 120GS2-107 within a preset time [timer #5] the conveyor is considered empty and the next set of bales can be received from the storage conveyor. When the bales reach photocell 120GS2-107, the bales will be fed into the pulper at reduced conveyor speed and without delay.

The pulper feed sequence is now ended and a new batch can be de-wired.

Point of Control

Local and remote operation

Graphic Display

Bale Handling System graphic, X.X

Interlocks

The conveyer will stop cannot start:

-The pulper feed conveyor cannot be run backwards if Local/Remote switch 120HS1-107 is in LOCAL AND control switch Forward/Reverse 120HS2-107 is selected in reverse AND bale limit switch 120GS1-107 is activated.

-Emergency stop 120HZ1-996 tripped, all e stops buttons and pull rope switches

- The pulper feed conveyor cannot be run forward if pulper level 121LI-101 not OK and bale limit switch GS2-107 is activated.

Local Mode

The conveyor can be run in forward and in reverse by the operator at the conveyor, local panel with switch 120HS2-107

Manual Mode

No DCS manual mode

Auto Mode

The conveyor will start and stop in the storage conveyor sequence and bale pulper sequence.

Indication

Standard motor display.

5.1.5 Bale release sensor - 120GS-101

Loop Number

120GS-101 - DI

Process Function

A bale release sensor 120GS-101 prevents the de wiring conveyor from starting if the stack is not lifted.

Point of Indication

No indication

Graphic Display

No System graphic

Indication

Green when activated

5.1.6 De-wiring conveyor Bale loading position at inlet end 120GS1-102

Loop Number

120GS1-102 - DI

Process Function

The switch is activated when a bale is placed on the de-wiring conveyor at the loading zone.

Point of Control

The signal is activated when the bale is placed on top of the switch

Graphic Display

No graphic,

Indication

Green when activated

5.1.7 De-wiring conveyor Bale loading position at outlet end - 120GS2-102

Loop Number

120GS2-102

Process Function

The loop indicates when the de-wiring conveyor is full. When the first bale reaches the switch the de wiring conveyor 120E-101-M1 stops and it is not possible to put on more bales.

Point of Control

The signal is activated when the bale is on top of the switch

Graphic Display

Bale Handling System graphic, X.X

Indication

Green when activated

5.1.8 De-wiring conveyor remote/local selector switch – 120HS1-102A and 120HS1-102B

Loop Number

120HS1-102A – DI

120HS1-102B - DI

Process Function

The de-wiring desk remote/local switch allows the operator to change the state of the de wiring conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-101 Remote mode

Selector Switch position left, conveyor 120E-101 Local mode

Point of control

Control desk CD003, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS”DE-WIRING IN LOCAL”

5.1.9 De-wiring conveyer forward / reverse selector switch 120HS2-102A/B

Loop Number

120HS2-102A -DI

120HS2-102B -DI

Process Function

The de-wiring conveyor “forward” selector allows the operator at the control desk 120CD-003 to drive the de-wiring conveyor forward: the de-wiring conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-102.

The de-wiring conveyor “reverse” selector allows the operator at the control desk 120CD-003 to drive the de-wiring conveyor in reverse: the de-wiring conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS1-102.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-102B.

Selector Switch position right, Conveyor 120E-101 Forward

Selector Switch position left, Conveyor 120E-101 Reverse

Point of Control

De-wiring/pulp conveyor control desk 120CD-

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.10 De wiring complete SW illuminated push button 120HSI1-102A/B

Loop Number

120HSI1-102A – DI - Button

120HSI1-102B – DI - Light

Process Function

The de-wiring complete SW button is activated by the operator when all bales of SW are loaded and de wired on the conveyor. The push button will flash for 5 seconds and the operator needs to confirm selection by pushing the button once more with in this time. The light will illuminate solid and the signal will indicate in the DCS that the batch is ready to be fed on to the pulp conveyor by the conveyor sequence.

Point of Control

De-wiring/pulp conveyor control desk 120CD-003

Graphic Display

Bale handling system graphic 1.1

Indication

“De-wiring complete SW” is shown

5.1.11 Storage conveyor at inlet end 120GS1-103

Loop Number

120GS1-103 - DI

Process Function

The switch is activated when a bale is passing

Point of Control

The signal is activated when the bale is placed on top of the switch

Graphic Display

No graphic,

Indication

Green when activated

5.1.12 Storage conveyer Bale loading position at outlet end - 120GS2-103

Loop Number

120GS2-103

Process Function

The loop indicates when the storage conveyor is full. When the first bale reaches the switch the storage conveyor 120E-102-M1 stops and it is not possible to put on more bales.

Point of Control

The signal is activated when the bale is on top of the switch

Graphic Display

Bale Handling System graphic, X.X

Indication

Green when activated

5.1.13 Storage conveyor remote/local selector switch – 120HS1-103A and 120HS1-103B

Loop Number

120HS1-103A – DI

120HS1-103B - DI

Process Function

The control desk CD003 remote/local switch allows the operator to change the state of the storage conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-102 Remote mode

Selector Switch position left, conveyor 120E-102 Local mode

Point of control

Control desk CD003, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS ”STORAGE IN LOCAL”

5.1.14 Storage conveyer forward / reverse selector switch 120HS2-103A/ 120HS2-103B

Loop Number

120HS2-103A -DI

120HS2-103B -DI

Process Function

The storage conveyor “forward” selector allows the operator at the control desk 120CD-003 to drive the storage conveyor forward: the storage conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-003.

The storage conveyor “reverse” selector allows the operator at the control desk 120CD-003 to drive the storage conveyor in reverse: the storage conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS1-103.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-103B.

Selector Switch position right, Conveyor 120E-102 Forward

Selector Switch position left, Conveyor 120E-102 Reverse

Point of Control

Control desk 120CD-003

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.15 Lifting beam selector switch 120HS1-104A/B

Loop Number

120HS1-104A - DI

Process Function

The de-wiring conveyor lifting beam selector switch 120HS1-104A/B allows the operator at the control desk 120CD-003 to raise and lower the beam. The selector switch is activating solenoid valve 120HSV1-104A(up)and 120HSV1-104B(down).

This button operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch.

Selector Switch position right, lifting beam up

Selector Switch position left, lifting beam down

Point of Control

De-wiring/pulp conveyor control desk 120CD-003

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.16 Lifting beam up 120HSV1-104A

Loop Number

120HSV1-104A

Process Function

The lifting beam up solenoid valve is used to raise the de-wiring beam to upper position so the operator can de-wire the bales easier.

Point of control

Only local control at 12OCD-003

Point of Indication

No local indication

Graphic Display

No System graphic,

Indication

Standard indication

5.1.17 Lifting beam down 120HSV1-104B

Loop Number

120HSV1-104B

Process Function

The lifting beam down solenoid valve is used to lower the de-wiring beam to lower position after the operator have de-wire the bales.

Point of control

Only local control at 12OCD-003

Point of Indication

No local indication

Graphic Display

No System graphic,

Indication

Standard indication

5.1.18 Pulper feed conveyor Reverse interlock sensor 120GS1-107

Loop Number

120GS1-107 - DI

Process Function

The pulper feed conveyor cannot be run backwards if LOCAL control 120HS-107 is selected AND reverse interlocking sensor 120GS1-107 is activated, this is to prevent bales reversing onto the storage conveyor when the pulper feed conveyor is in reverse.

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, xx

Indication

Green when activated

5.1.19 Pulper feed conveyor loaded switch 120GS2-107

Loop Number

120GS2-107 - DI

Process Function

The loop indicates if any bales are at the top of the pulper feed conveyor. When the first bale reaches the switch the pulper feed conveyor 120E-103M1 stops.

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, xx

Indication

Green when activated

5.1.20 Pulper feed conveyor remote/local switch – 120HS1-107A/120HS1-107B

Loop Number

120HS1-107A – DI

120HS1-107B - DI

Process Function

The conveyor control desk CD003 remote/local switch allows the operator to change the state of the pulper feed conveyor to local or remote mode.

Selector Switch position right, conveyor 120E-103 Remote mode

Selector Switch position left, conveyor 120E-103 Local mode

Point of control

Control desk CD003, No DCS operation

Point of Indication

At DCS only, no local indication

Graphic Display

Bale Handling System graphic, 1.1

Indication

Indication in DCS ”LOADING IN LOCAL”

5.1.21 Pulper feed conveyer forward / reverse switch 120HS2-107A/120HS2-107B

Loop Number

120HS2-107A -DI

120HS2-107B -DI

Process Function

The pulper feed conveyor “forward” selector allows the operator at the control desk 120CD-003 to drive the pulper feed conveyor forward: the pulper feed conveyor will run as long the signal is maintained providing it is not stopped by an interlock or switch 120GS2-107.

The pulper feed conveyor “reverse” selector allows the operator at the control desk 120CD-003 to drive the feed conveyor in reverse: the feed conveyor will run as long the signal is maintained providing it is not stopped by an interlock (see 6.1.4) or switch 120GS1-107.

This selector operates only when the de-wiring conveyor is in local mode as indicated by the local mode switch 120HS1-107B.

Selector Switch position right, Conveyor 120E-103 Forward

Selector Switch position left, Conveyor 120E-103 Reverse

Point of Control

De-wiring/pulp conveyor control desk 120CD-003

Graphic Display

No display in the DCS

Indication

No indication in the DCS

5.1.22 Audio alarm “pre warning conveyors start” – 120XI-115

Loop Number

120XI-115 - DO

Process Function

Before start of conveyor movement, the alarm horn gives a 5 second signal to inform operators that movement will start shortly. The controls should be set to REMOTE mode and the pulper feed system should be loaded with bales. This is a part of conveyor sequence, see 1.3.4

Point of control

No control in DCS

Graphic Display

No display

Indication

No indication

5.1.23 Load SW de wiring conveyor A 120XI-117

Loop Number

120XI-117 - DO

Process Function

A fixed green light is lit when the pulper feed system is running in REMOTE mode and softwood bale loading is allowed.

A flashing green light is lit when the de wiring conveyor has received a full batch of bales and de wiring can be performed safely

Point of control

No control in DCS

Graphic Display

No display

Indication

No indication

5.1.24 Light indicator “Conv. Busy”120XI-119

Loop Number

120XI-119 - DO

Process Function

A fixed red light is illuminated when the conveyor 120E-102 is busy, i.e. the conveyor is running, the conveyor is set to LOCAL mode or that the production is stopped. This means that bale loading is forbidden if:

- Transferring sequence ongoing conveyor 120E-101
- Transferring sequence ongoing conveyor 120E-102

Point of control

No control in DCS

Graphic Display

NA

Indication

NA

5.1.25 Weighing system – 120WI-110

Loop Number

120WI-110 – No I/O

Process Function

The loop collects data from eight weight cells on the pulper feed conveyor, the weight of the bales are used for calculating the correct amount of water to be added in the pulper.

The weighing system with eight weigh modules (load cells) is shown in Figure 3 and described in Table 3.

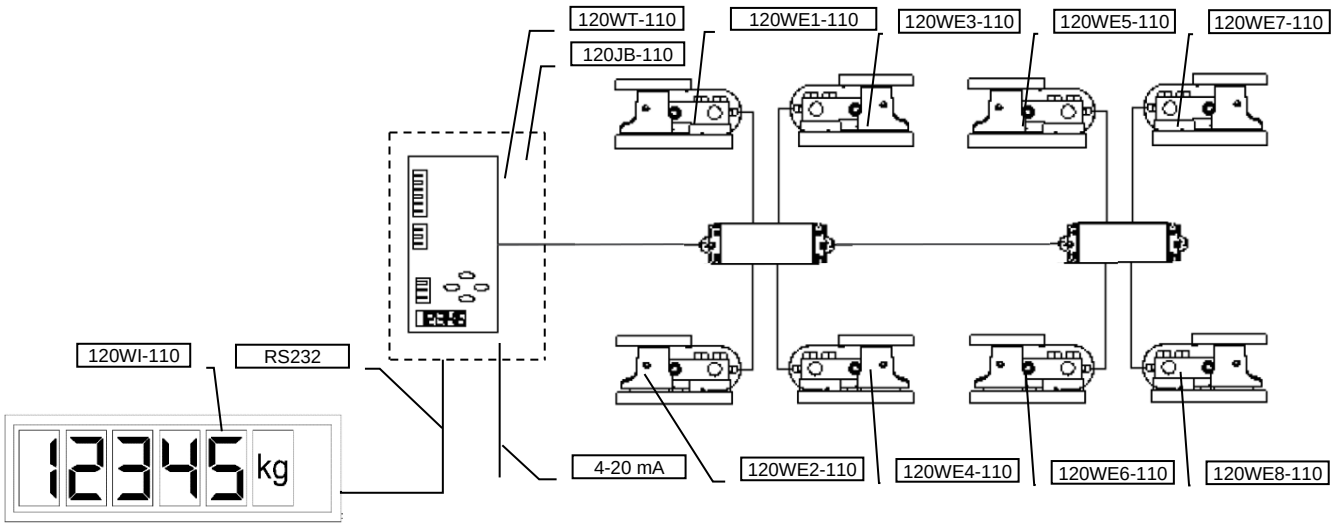


Figure 3 Weighing system with eight load cells

Table 3 Description of the weighing system

Standard Item/Tag	Customer Item/Tag	Device	Function
120WI-110		External display	Large display to visualize the loaded weight for the operator
120WT-110		Weighing terminal	Weighing terminal with weight indication
120JB-110		Junction box	Junction box for the weighing terminal

120JB-110.1		Load cell junction box #1	Precision junction box for multiple load cell connection
120JB-110.2		Load cell junction box #2	Precision junction box for multiple load cell connection
120WE1-110		Load cell #1	Load cell for weight registration
120WE2-110		Load cell #2	Load cell for weight registration
120WE3-110		Load cell #3	Load cell for weight registration
120WE4-110		Load cell #4	Load cell for weight registration
120WE5-110		Load cell #5	Load cell for weight registration
120WE6-110		Load cell #6	Load cell for weight registration
120WE7-110		Load cell #7	Load cell for weight registration
120WE8-110		Load cell #8	Load cell for weight registration

Point of Indication

External local display

Graphic Display

In DCS

Indication

Total weight is showed

5.1.26 Conveyor system control desk 120CD-003

Desk Number

120CD-003

Process Function

To enable operation of the de wiring and pulp conveyor locally

Point of Control

DCs and Local operation

Graphic Display

No display

Local Mode

The de-wiring and pulp conveyor can be operated locally by the operator.

de-wiring and loading

In auto mode the DCS takes over control. The de-wiring and pulp conveyor are controlled by the conveyor sequence see 6.2.1.

Indication

NA

5.1.27 Emergency stop bale handling 120HZ1-996

Loop Number

120HZ1-996

Process Function

Mush room button in control desk CD003

Emergency stop for bale handling system.

When emergency stop is activated at the control desk following will stop

- Pulper 121E-101-M1
- Pulper feed conveyor 120E-103-M1
- Storage conveyor 120E-102-M1
- De-wiring conveyor 120E-101-M1

Reset of emergency stop at local control desk 120CD-003 120HSI-996

Point of Control

Mush room button in control desk CD003

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.28 De wiring conveyor rope pull safety switch 120GZ1,2-996

Loop Number

120GZ1,2-996 DIZ

Process Function

A safety rope is mounted on the side of de wiring conveyor, if this is pulled and switch 120GZ1,2-996 is activated the emergency stop will be activated and following will be stopped

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-103-M1
- Storage conveyor 120E-102-M1
- De-wiring conveyor 120E-101-M1

Reset of emergency stop at local control desk 120CD-003 120HZI-996A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.29 Pulper feed conveyor rope pull safety switch 120GZ3,4-996

Loop Number

120GZ3,4-996 DIZ

Process Function

A safety rope is mounted in the roof of the pulper feed conveyor canape, if this is pulled and switch 120GZ3,4-996 is activated the emergency stop will be activated, and following will be stopped

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-103-M1
- Storage conveyor 120E-102-M1
- De-wiring conveyor 120E-101-M1

Reset of emergency stop at local control desk 120CD-003 120HZI-996A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“E-stop” On DCS display

5.1.30 Pulper feed conveyor rope pull safety switch 120GZ5,6-996

Loop Number

120GZ5,6-996 DIZ

Process Function

A safety rope is mounted in the roof of the pulper feed conveyor canape, if this is pulled and switch 120GZ5,6-996 is activated the emergency stop will be activated, and following will be stopped

- Pulper 121E-001-M1
- Pulper feed conveyor 120E-103-M1
- Storage conveyor 120E-102-M1
- De-wiring conveyor 120E-101-M1

Reset of emergency stop at local control desk 120CD-003 120HZI-996A

Point of Control

- Safety rope

Graphic Display

Bale Handling System graphic, X.X

Indication

“EZ” On DCS display

5.1.31 Emergency stop reset illuminated push button 120HSI-996A/B

Loop Number

120HSI-996A – DI - reset

120HSI-996B – DO – light for emergency stop tripped

Process Function

- If the safety relay has been activated, a reset of the safety relay must be done to restart the pulper feed system. This can be done with the illuminated push button HSI-996A on the local control desk CD-003.
- Fixed blue light indicates that the emergency stop relay is possible to reset

Point of Control

Control desk 120CD-003

Graphic Display

Bale handling system graphic 1.1

Indication

Blue light in control desk is shown

5.2 CONVEYOR SEQUENCE

Note that all interlocks are valid all times and will override any Sequence logic where applicable.

Note that the Sequence logic is valid only whilst the Sequence is active but will override any other logic (with exception of interlocks) during that time where applicable.

The start sequence for the conveyor system consist of three types of transferring sequences

1. De wiring to storage
2. Storage to loading
3. Loading sequence for pulper

The concept for starting the sequences is that then system is in auto the conveyor will start if the next conveyor is empty.

First batch

- Load de wiring conveyor and de-wire
- The operator now pushes “de-wiring complete SW” 120HSI1-102 or 120HSI2-102 on control desk CD003.

  Now the sequence is ready to start

Sequence permissive

Before being available for selection, the sequence requires the following conditions to be met:

- De-wiring conveyor 120E-101 M1 in Remote

- Storage conveyor 120E-102 M1 in Remote
- Pulper feed conveyor 120E-103M1 in Remote
- Signal from “De-wiring complete” activated

5.2.1 Start sequence 1

Bales on de wiring conveyor to be moved to end of storage conveyor

Sequence will start if 120GS2-103 bales position in outlet end storage conveyor not activated.

Step 1. START SEQUENCE 1

- Pre warning conveyors start, audible alarm 120XI-115 activates for 5 sec before conveyors start- Timer T4

Before going to next step, the sequence checks following conditions are met:

- End of Timer T4 120XI-115 go off

Step 2. START CONVEYORS

- Start de-wiring conveyor 120E-101M1
- Start storage conveyor 120E-102M1
- Activate visual signal 120XI-119 conveyor system busy

Now one batch transferred from de wiring conveyor on to the storage conveyor

Before going to next step, the sequence checks following conditions are met:

- De-wiring conveyor 120E-101M1 - RUN
- Storage conveyor 120E-102M1- RUN

Step 3. STOP PRE-WARNING

Before going to next step, the sequence checks following conditions are met:

- Storage conveyor bale loaded in outlet end switch 120GS2-103 to be activated.

Step 4. STOP CONVEYORS

- Stop de-wiring conveyor 120E-101M1
- Stop storage conveyor 120E-102M1
- Indication light 120XI-119 go off

Before going to step 1 the sequence checks following conditions are met:

- De-wiring conveyor 120E-101M1 - Stop
- Storage conveyor 120E-102M1- Stop

One batch is now waiting to be feed over to the pulper feed conveyor, now the operator can load and de wire a new batch.

5.2.2 Start sequence 2

Bales from storage conveyor to be moved to pulper feed conveyor.

Sequence will start if 120GS2-107 not activated by bales in upper position.

Step 1. START SEQUENCE 2

- Pre warning conveyors start, audible alarm 120XI-115 activates for 5 sec before conveyors start- Timer T1

Before going to next step, the sequence checks following conditions are met:

- End of Timer T1 120ZXI-115 go off

Step 2. START CONVEYORS

- Start Storage conveyor 120E-102M1
- Start pulper feed conveyor 120E-103M1
- Activate visual signal 120XI-119 conveyor system busy

Now one batch is going of the storage and up on the pulper feed conveyor

Before going to next step, the sequence checks following conditions are met:

- Storage conveyor 120E-102M1 - RUN
- Pulper feed conveyor 120E-103M1- RUN

Step 3. STOP PRE-WARNING

Before going to next step, the sequence checks following conditions are met:

- Pulper feed conveyor bale loaded in outlet end switch 120GS2-107 to be activated.

Step 4. STOP CONVEYORS

- Stop storage conveyor 120E-102M1
- Stop pulper feed conveyor 120E-103M1
- Indication light 120XI-119 go off

Before going to step 1 the sequence checks following conditions are met:

- Storage conveyor 120E-102M1 - Stop
- Pulper feed conveyor 120E-103M1- Stop

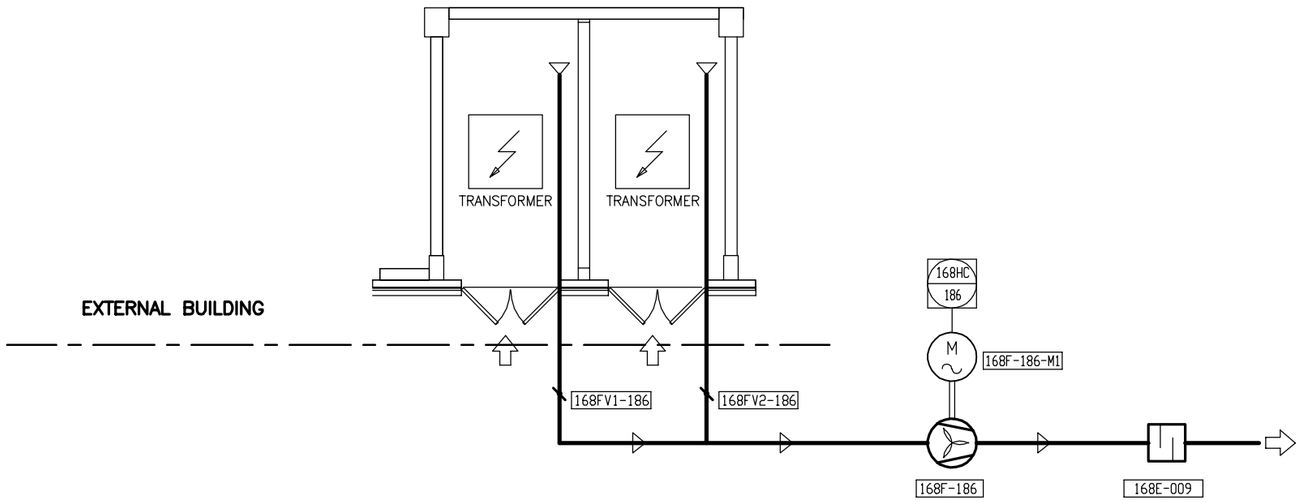
5.2.3 Start sequence 3

Bales on pulper feed conveyor to be entering the pulper

Sequence 3 will start when signal is activated from pulper sequence

This will be a part of the pulper sequence.

BALE PULPERS TRANSFORMERS ROOM EXTRACTOR



SYMBOLS LEGEND

BY VALMET / BY OTHERS — FIELD LOCAL INSTRUMENT
STRUMENTO LOCALE IN CAMPO

BY VALMET / BY OTHERS — LOCAL INSTRUMENT IN LOCAL PANEL
STRUMENTO LOCALE IN QUADRO LOCALE

CONNECTION FROM/TO DCS
CONNESSIONI DA/A DCS

NORMALLY CLOSE SOLENOID VALVE
E. VALVOLA NORMALMENTE CHIUSA

NORMALLY OPEN SOLENOID VALVE
E. VALVOLA NORMALMENTE APERTA

NORMALLY OPEN MANUAL BALL VALVE
VALVOLA MANUALE NORMALMENTE APERTA

NORMALLY CLOSED MANUAL BALL VALVE
VALVOLA MANUALE NORMALMENTE CHIUSA

NORMALLY OPEN MANUAL GLOBE VALVE
VALVOLA MANUALE DI REG. NORM. APERTA

M — AC MOTOR CENTRIFUGAL FAN
VENT. CENTRIFUGO MOTORE AC

SC — INVERTER/CONVERTER

AIR FILTER
FILTRO ARIA

FIRE DAMPER WITH FUSE
SERRANDA TAGLIAFUOCO CON FUSIBILE

SILENCER
SILENZIATORE

WASHING UNIT
UNITA' LAVAGGIO

VALMET GOR / CUSTOMER — DELIVERY LIMITS
LIMITI DI FORNITURA

BY VALMET / BY OTHERS — PNEUMATIC LINE
LINEA ARIA COMPRESSA

DCS LOOP LINE
LINEA REGOLAZIONI A DCS

BY VALMET / BY OTHERS — PIPELINE, EQUIPMENT OR INSTRUMENT
TUBAZIONI, EQUIPAGGIAMENTI O STRUMENTI

Data Date	Nome Name	Verificato Checked by	Descrizione Revision	Mod/rev Chs/Key

en

PROJECTION: ISO | SCALE | WEIGHT Kg

SWE JUPITER
UK

220046 - 420496

PRODUCT

P&Id
BALE PULPERS TRANSFORMER ROOM EXHAUST

DESD MCe	DATE 05.10.2020	
CHKD WTu	DATE 05.10.2020	
APPD FAn	DATE 05.10.2020	

REF. | SUPERS. | A3

WORK | FILE GORB18646.00 | AutoCAD

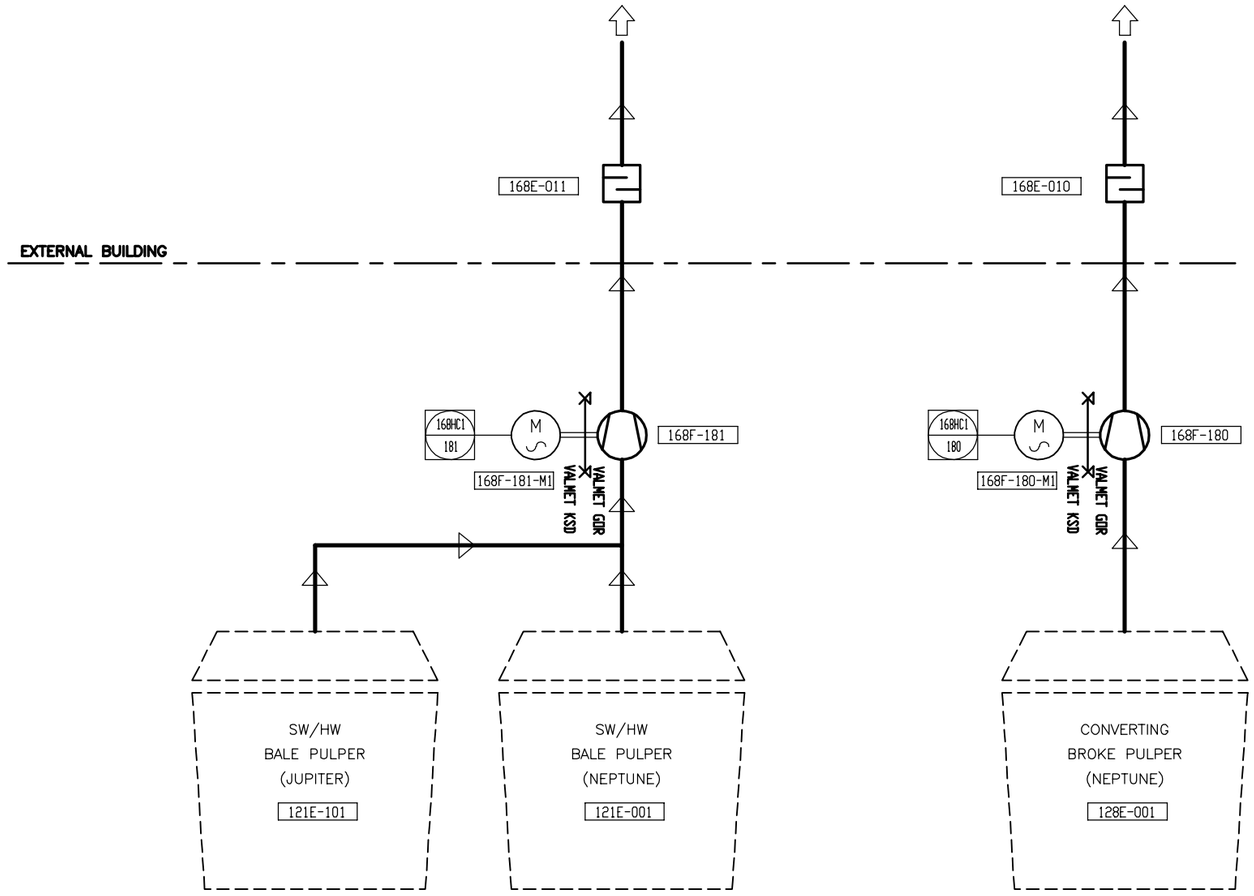
DRAWING ID: GORB18646.00 | SHEET: 1(1)

Valmet

CERTIFIED

Signature MCe
Date 05 Oct. 2020

BALE PULPERS EXHAUST



SYMBOLS LEGEND

BY VALMET / BY OTHERS — FIELD LOCAL INSTRUMENT
STRUMENTO LOCALE IN CAMPO

BY VALMET / BY OTHERS — LOCAL INSTRUMENT IN LOCAL PANEL
STRUMENTO LOCALE IN QUADRO LOCALE

CONNECTION FROM/TO CUSTOMER DCS
CONNESSIONI DA/A DCS CLIENTE

NORMALLY CLOSE SOLENOID VALVE
E. VALVOLA NORMALMENTE CHIUSA

NORMALLY OPEN SOLENOID VALVE
E. VALVOLA NORMALMENTE APERTA

NORMALLY OPEN MANUAL BALL VALVE
VALVOLA MANUALE NORMALMENTE APERTA

NORMALLY CLOSED MANUAL BALL VALVE
VALVOLA MANUALE NORMALMENTE CHIUSA

NORMALLY OPEN MANUAL GLOBE VALVE
VALVOLA MANUALE DI REG. NORM. APERTA

M — AC MOTOR CENTRIFUGAL FAN
VENT. CENTRIFUGO MOTORE AC

SC — INVERTER/CONVERTER

AIR FILTER
FILTRO ARIA

FLEXIBLE JOINT
GIUNTO FLESSIBILE

SILENCER
SILENZIATORE

WASHING UNIT
UNITA' LAVAGGIO

VALMET GDR / CUSTOMER — DELIVERY LIMITS
LIMITI DI FORNITURA

BY VALMET / BY OTHERS — PNEUMATIC LINE
LINEA ARIA COMPRESSA

DCS LOOP LINE
LINEA REGOLAZIONI A DCS

BY VALMET / BY OTHERS — PIPELINE, EQUIPMENT OR INSTRUMENT
TUBAZIONI, EQUIPAGGIAMENTI O STRUMENTI

Data Date	Nome Name	Verificato Checked by	Descrizione Revision	Mod/rev Chs/Key

en

Valmet

PROJECTION: ISO | SCALE | WEIGHT Kg

SWE JUPITER
UK

220046 - 420496

PRODUCT

P&Id
BALE PULPERS EXHAUST

DESD MCe	DATE 05.10.2020	
CHKD WTu	DATE 05.10.2020	
APPD FAn	DATE 05.10.2020	

REF. | SUPERS. | A3

WORK | FILE GORB18645.00 | AutoCAD

DRAWING ID: GORB18645.00 | SHEET: 1(1)

Valmet

CERTIFIED

Signature MCe
Date 05 Oct. 2020

OUTSIDE BUILDING

MV ROOM

OFFICE

CABLE CELLAR

MCC ROOM

TRANSFORMERS ROOM

1% SLOPE

(ø28mm TBD) GAS LINE

(ø16mm TBD) LIQUID LINE

168E-970

168E-975

168E-975-M1

168E-975-M2

168E-975-M3

VALMET GDR

VALMET KSD

pipe 1"

10% SLOPE

PIPELINE FOR DRAINING OUTSIDE MCC ROOM

168T11 962

168T1 962

168T03 971

168T05 971

TEMPERATURE SET-POINT

MV ROOM OVERPRESSURE

168FV1-963

168D27 963

168D27 963

(ø35mm TBD) GAS LINE

(ø22mm TBD) LIQUID LINE

168E-945

168E-945-M1

168E-945-M2

168E-945-M3

168E-946

168E-946-M1

168E-946-M2

168E-946-M3

168T11 936

168T1 936

168T03 941

168T05 941

168A 940

168E-940

168D27 933

168D27 933

168FV1-933

MCC ROOM OVERPRESSURE

168C 960

168E-960-M1

168A 960

168C 961

168E-960

168E-962

168E-961

AIR FROM CABLE CELLAR

168C 930

168E-930-M1

168A 930

168C 931

168E-931

168E-932

168E-930

ADDITIONAL INFORMATION FOR REFRIGERANT R410A PIPELINE

SUPPLY PIPES (LIQUID LINE)
EXTERNAL DIAMETER 28mm, MATERIAL COPPER

RETURN PIPES (GAS LINE)
EXTERNAL DIAMETER 42mm, MATERIAL COPPER,
WITH 19mm OF INSULATION

THERMOSTATIC VALVE

PRELIMINARY

Signature _____

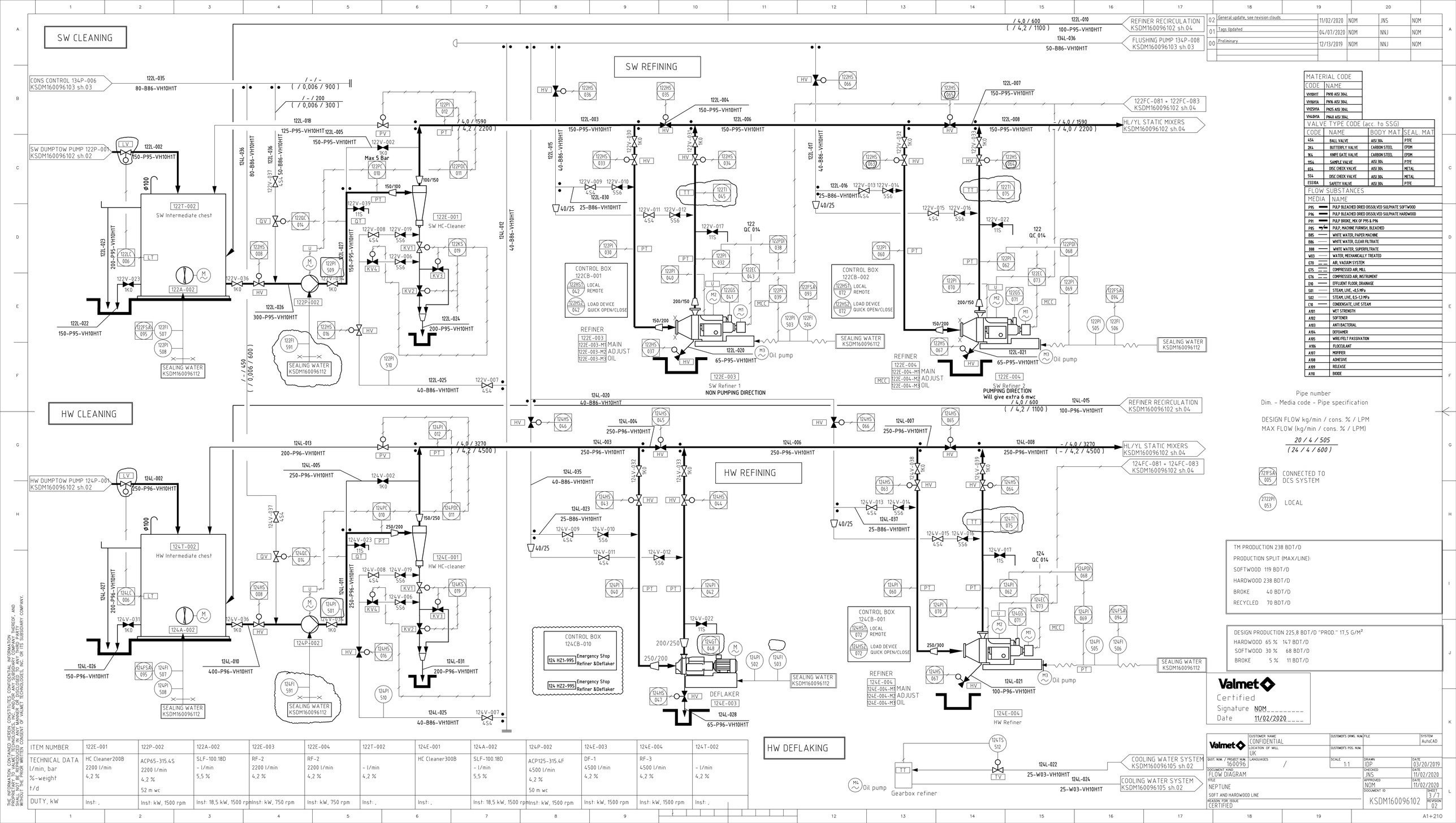
Date _____

SYMBOLS LEGEND

- FIELD LOCAL INSTRUMENT — STRUMENTO LOCALE IN CAMPO
- CONNECTION WITH MCC — CONNESSIONI CON MCC
- LOCAL INSTRUMENT IN LOCAL PANEL — STRUMENTO LOCALE IN QUADRO LOCALE
- CONNECTION FROM/TO CUSTOMER DCS — CONNESSIONI DA/A DCS CLIENTE
- CONNECTION FROM/TO COOLING UNIT CTRL SYSTEM — CONN. DA/A SISTEMA DI CONTR. GRUPPO FRIGO
- DELIVERY LIMITS — LIMITI DI FORNITURA
- BACKLOAD PIPELINE — LINEA DI CONTROPRESSIONE
- SIGNAL LINE TO DCS — LINEA SEGNALI AL DCS
- SIGNAL LINE TO COOLING UNIT — LINEA SEGNALI AL GRUPPO FRIGO
- PIPELINE OR EQUIPMENT BY OTHERS — TUBAZIONI O PARTI FORNITE DA ALTRI
- PIPELINE OR EQUIPMENT DELIVERED BY METSO — TUBAZIONI O PARTI FORNITE DA METSO
- INSULATED PIPELINE — TUBAZIONE COIBENTATA
- NORMALLY OPEN MANUAL VALVE — VALVOLA MANUALE NORMALMENTE APERTA
- NORMALLY OPEN MANUAL VALVE — VALVOLA MANUALE NORMALMENTE APERTA
- CHECK VALVE — VALVOLA DI NON RITORNO
- THREE WAY VALVE — V. VALVOLA A TRE VIE
- SAFETY VALVE — VALVOLA DI SICUREZZA
- AUTOMATIC DEARATOR — VALVOLA DI SFIATO AUTOMATICA
- GENERIC FILTER — FILTRO GENERICO
- NORMALLY CLOSE SOLENOID VALVE — E. VALVOLA NORMALMENTE CHIUSA
- NORMALLY OPEN SOLENOID VALVE — E. VALVOLA NORMALMENTE APERTA
- MANUAL VALVE — VALVOLA MANUALE
- PRESSURE STABILIZER — STABILIZZATORE DI PRESSIONE
- THREE WAY VALVE — E. VALVOLA A TRE VIE
- GAS FILTER — FILTRO GAS
- FLOWREDUCER — REGOLATORE DI FLUSSO
- DAMPER WITH ELECTRIC ACTUATOR — SERRANDA CON ATT. ELETTRICO
- MANUAL DAMPER — SERRANDA MANUALE
- DAMPER WITH ON/OFF SOL.VALVE — SERRANDA CON E.VALVOLA ON/OFF
- DAMPER WITH PNEUM. ACTUATOR P/P — SERRANDA CON ATT. PNEUMATICO P/P
- I/P CONVERTER — CONVERTITORE I/P
- AC MOTOR CENTRIFUGAL FAN — VENT. CENTRIFUGO MOTORE AC
- CC MOTOR CENTRIFUGAL FAN — VENT. CENTRIFUGO MOTORE CC
- AC MOTOR AXIAL FAN — VENT. ASSIALE MOTORE AC
- INVERTER/CONVERTER
- PUMPS — POMPE
- COIL EXCHANGER — BATTERIE DI SCAMBIO ACQUA O VAPORE
- AIR FILTER — FILTRO ARIA
- FLEXIBLE JOINT — GIUNTO FLESSIBILE
- SILENCER — SILENZIATORE
- WASHING UNIT — UNITA' LAVAGGIO
- AIR/AIR HEAT EXCHANGER — SCAMBIATORE ARIA/ARIA
- AIR/WATER HEAT EXCHANGER — SCAMBIATORE ARIA/ACQUA
- WET DUST COLLECTOR — COLLETTORE AD UMIDO
- WET DUST PULPER EXHAUST — ESTRAZIONE PA PULPER AD UMIDO
- DRAIN MODULE — MODULO DI SCARICO
- IN LINE VENTURI — VENTURI IN LINEA

Data Date	Nome Name	Verificato Checked by	Descrizione Revision	Mod/rev Chs/Key

	en	SWE JUPITER UK	
Valmet	PROJECTION ISO / SCALE / WEIGHT Kg	220046 - 420496	
PRODUCT		DESD MCe	DATE 05.10.2020
P&Id		CHKD WTu	DATE 05.10.2020
BALE PULPERS MCC & MV ROOM VENTILATION		APPD FAn	DATE 05.10.2020
REF.	SUPERS.	A1	DRAWING ID GORA68151.00 / SHEET 1(1)
WORK	FILE GORA68151.00	AutoCAD	



MATERIAL CODE	
CODE	NAME
VH10HST	PN10 AISI 304L
VH16HSTA	PN16 AISI 304L
VH25HSTA	PN25 AISI 304L
VH40HSTA	PN40 AISI 304L

VALVE TYPE CODE (acc. to SSG)			
CODE	NAME	BODY MAT	SEAL MAT
454	BALL VALVE	AISI 304	PTFE
2K4	BUTTERFLY VALVE	CARBON STEEL	EPDM
9K4	KNIFE GATE VALVE	CARBON STEEL	EPDM
11S4	SAMPLE VALVE	AISI 304	PTFE
654	DISC CHECK VALVE	AISI 304	METAL
554	DISC CHECK VALVE	AISI 304	METAL
ESS10A	SAFETY VALVE	AISI 304	PTFE

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W03	WATER, MECHANICALLY TREATED
G70	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
I210	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, -0,5 MPa
S02	STEAM, LIVE, 0,5-1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MODIFIER
A108	ADHESIVE
A109	RELEASE
A110	BIOCIDE

0.2	General update, see revision clouds	11/02/2020	NOM	JNS	NOM							
0.1	Tags Updated	04/07/2020	NOM	NNJ	NOM							
0.0	Preliminary	12/13/2019	NOM	NNJ	NOM							

ITEM NUMBER	122E-001	122P-002	122A-002	122E-003	122E-004	122T-002	124E-001	124A-002	124P-002	124E-003	124E-004	124T-002
TECHNICAL DATA l/min, bar %-weight t/d	HC Cleaner200B 2200 l/min 4,2 %	ACP65-315.4S 2200 l/min 4,2 % 52 m wc	SLF-100.18D - l/min 5,5 %	RF-2 2200 l/min 4,2 %	RF-2 2200 l/min 4,2 %	- l/min 4,2 %	HC Cleaner300B	SLF-100.18D - l/min 5,5 %	ACP125-315.4F 4500 l/min 4,2 % 50 m wc	DF-1 4500 l/min 4,2 %	RF-3 4500 l/min 4,2 %	- l/min 4,2 %
DUTY, kW	Inst: ,	Inst: kW, 1500 rpm	Inst: 18,5 kW, 1500 rpm	Inst: kW, 750 rpm	Inst: kW, 750 rpm	Inst: ,	Inst: ,	Inst: 18,5 kW, 1500 rpm	Inst: kW, 1500 rpm	Inst: kW, 1500 rpm	Inst: kW, 1500 rpm	Inst: ,

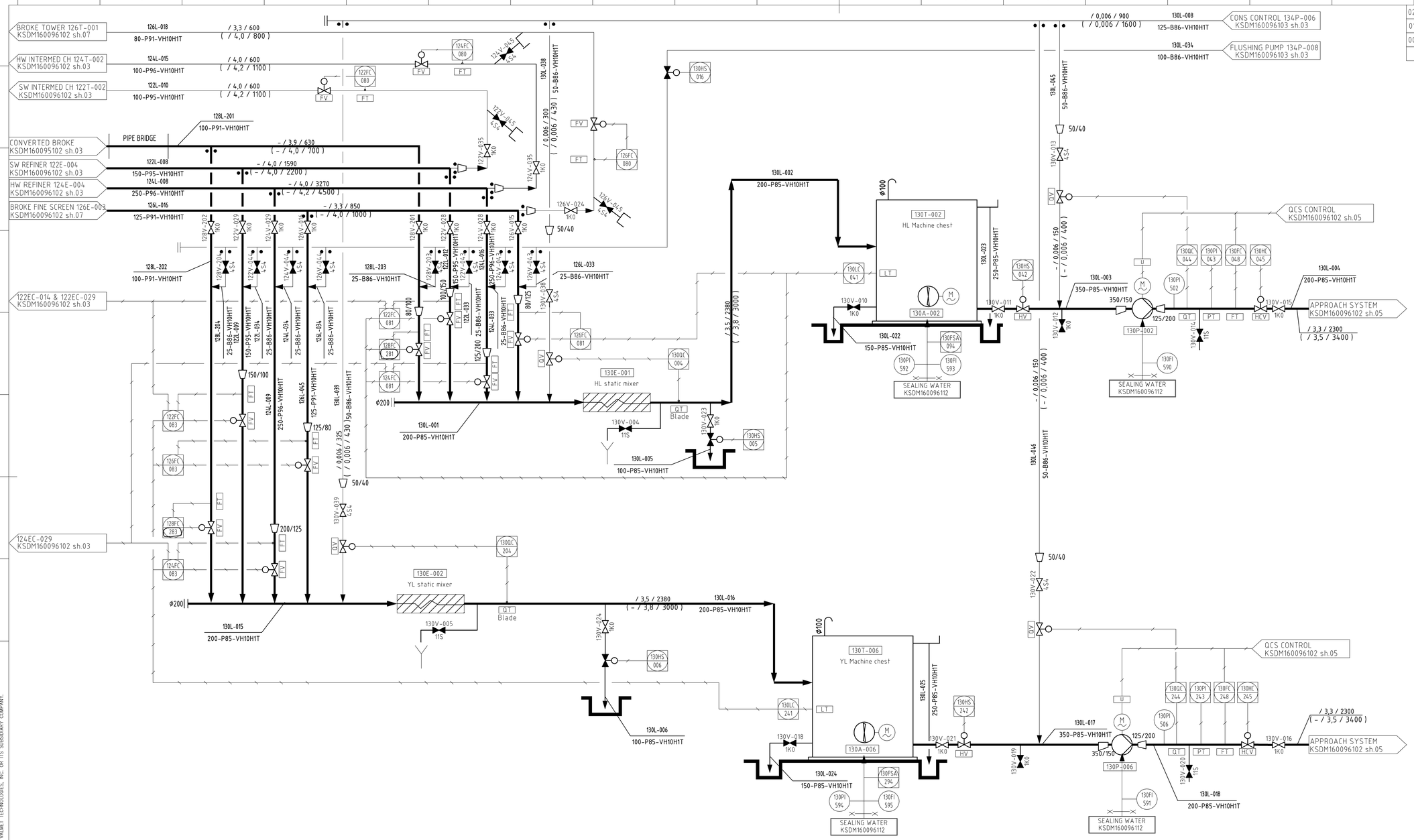
TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

Valmet Certified
Signature NOM
Date 11/02/2020

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.	SYSTEM: AutoCAD
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: /	SCALE: 1:1	DRAWN: IDP 03/20/2019
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: JNS 11/02/2020
TITLE: NEPTUNE SOFT AND HARDWOOD LINE			APPROVED: NOM 11/02/2020
REASON FOR ISSUE: CERTIFIED			DOCUMENT ID: KSDM160096102 SHEET: 3 / 7 REVISION: 02

A1+210



0.2	Certified, general revisson	11/02/2020	NOM	JNS	NOM
0.1	Certified	04/07/2020	NOM	NNJ	NOM
0.0	Preliminary	12/13/2019	NOM	NNJ	NOM

MATERIAL CODE	
CODE	NAME
VH10H1T	PN10 AISI 304L
VH16H1A	PN16 AISI 304L
VH25H1A	PN25 AISI 304L
VH40H1A	PN40 AISI 304L

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W93	WATER, MECHANICALLY TREATED
G70	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D10	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, ~0,5 MPa
S02	STEAM, LIVE, 0,5–1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MODIFIER
A108	ADHESIVE
A109	RELEASE
A110	BIOCIDE

DESIGN FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)
20 / 4 / 505
(24 / 4 / 600)

CONNECTED TO DCS SYSTEM
CONNECTED TO PLC SYSTEM
LOCAL

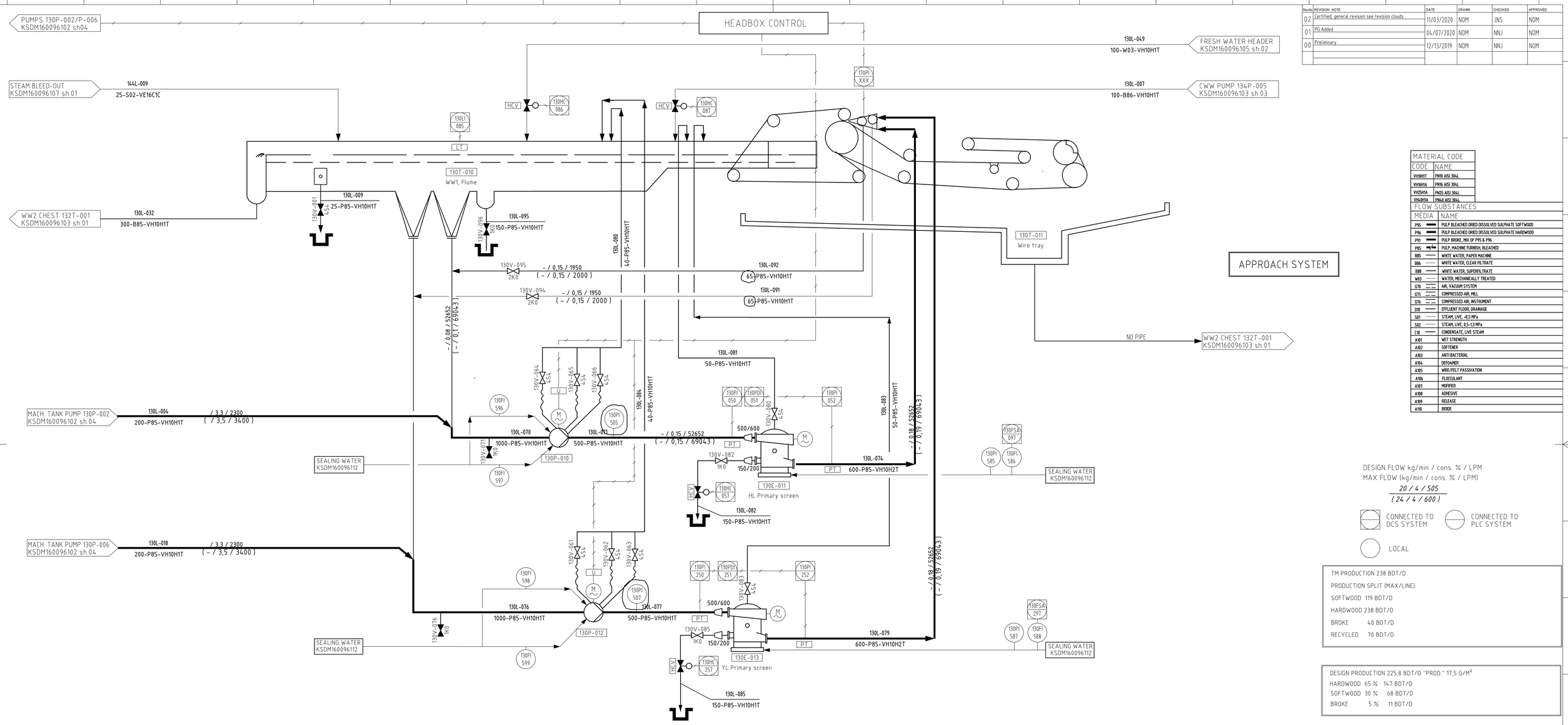
TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

Valmet
Certified
Signature NOM_____
Date 04/07/2020___

ITEM NUMBER	130E-001	130T-002	130A-002	130P-002	130E-002	130T-006	130A-006	130P-006
TECHNICAL DATA			SLF-80.15D	ACP125-315.4F			SLF-80.15D	ACP125-315.4F
l/min, bar	3000 l/min		l/min	3700 l/min	3000 l/min		- l/min	3700 l/min
%-weight	%	3,8 %	3,8 %	3,5 %	%	3,8 %	3,8 %	3,5 %
t/d		50 m³				50 m³		
DUTY, kW	Inst: ,		Inst: kW, 1500 rpm	Inst: kW, 1500 rpm	Inst: ,		Inst: kW, 1500 rpm	Inst: kW, 1500 rpm

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE	SYSTEM: AutoCAD
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.		
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: EN / -	SCALE: 1:1	DRAWN: IDP	DATE: 03/20/2019
DOCUMENT KIND: FLOW DIAGRAM	NTT 200HS		CHECKED: JNS	DATE: 11/02/2020
TITLE: NEPTUNE			APPROVED: NOM	DATE: 11/02/2020
MIXING SYSTEM	-		DOCUMENT ID: KSDM160096102	SHEET: 4 / 7 REVISION: 02
REASON FOR ISSUE: CERTIFIED				A1+210



Rev.No	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
02	Certified, general revision see revision clouds	11/03/2020	NOM	JNS	NOM
01	PG Added	04/07/2020	NOM	NNJ	NOM
00	Preliminary	12/13/2019	NOM	NNJ	NOM

MATERIAL CODE	
CODE	NAME
VH10HT	PN10 AISI 304L
VH16HTA	PN16 AISI 304L
VH25HTA	PN25 AISI 304L
VH40HTA	PN40 AISI 304L

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED (DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED (DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W03	WATER, MECHANICALLY TREATED
G76	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D70	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, <0,5 MPa
S02	STEAM, LIVE, 0,5-1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MOFIFIER
A108	ADHESIVE
A109	RELEASE
A110	BIOXIDE

DESIGN FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)
20 / 4 / 505
(24 / 4 / 600)

CONNECTED TO DCS SYSTEM
CONNECTED TO PLC SYSTEM
LOCAL

TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

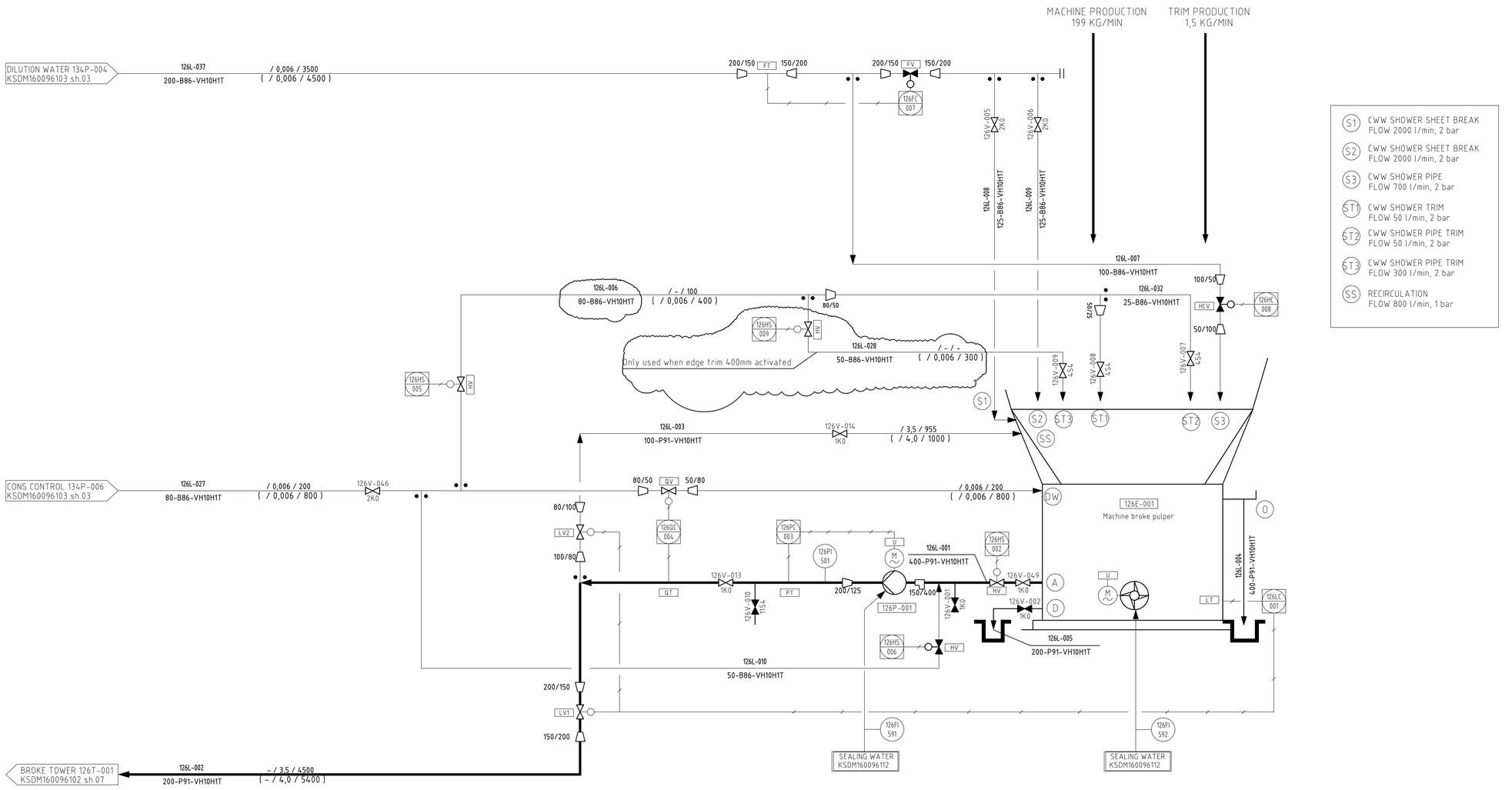
ITEM NUMBER	130P-010	130T-010	130E-011	130P-012	130E-013
TECHNICAL DATA	ASP500-570A.16S.FP		MS-340VT	ASP500-570A.16S.FP	MS-340VT
l/min, bar	69740 l/min		64707 l/min	69740 l/min	64707 l/min
%-weight	0,19 %	0,1 %	,04 %	0,19 %	0,4 %
	87 m wc	m³		87 m wc	
DUTY, kW	Inst: kW, 1500 rpm		Inst: kW, 1000 rpm	Inst: kW, 1500 rpm	Inst: kW, 1000 rpm

Valmet
Certified
Signature NOM
Date 11/03/2020

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE: SYSTEM: AutoCAD
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.	
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: EN / -	SCALE	DRAWN: IDP DATE: 03/20/2019
DOCUMENT KIND: FLOW DIAGRAM	NTT 200HS		CHECKED: JNS DATE: 11/03/2020
TITLE: NEPTUNE			APPROVED: NOM DATE: 11/03/2020
APPROACH SYSTEM	-		DOCUMENT ID: KSDM160096102 SHEET: 5 / 7 REVISION: 02
REASON FOR ISSUE: CERTIFIED			A1+210

UTM PULPER SYSTEM

Rev.No	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
0.2	Certified, see revision clouds	11/02/2020	JNS	NNJ	NOM
0.1	Certified	04/07/2020	NOM	NNJ	NOM
0.0	Preliminary	12/13/2019	NOM	NNJ	NOM



S1	CWW SHOWER SHEET BREAK FLOW 2000 l/min, 2 bar
S2	CWW SHOWER SHEET BREAK FLOW 2000 l/min, 2 bar
S3	CWW SHOWER PIPE FLOW 700 l/min, 2 bar
ST1	CWW SHOWER TRIM FLOW 50 l/min, 2 bar
ST2	CWW SHOWER PIPE TRIM FLOW 50 l/min, 2 bar
ST3	CWW SHOWER PIPE TRIM FLOW 300 l/min, 2 bar
SS	RECIRCULATION FLOW 800 l/min, 1 bar

MATERIAL CODE	
CODE	NAME
VH10H1T	PN10 AISI 304L
VH16H1A	PN16 AISI 304L
VH25H1A	PN25 AISI 304L
VH40H1A	PN40 AISI 304L

VALVE TYPE CODE (acc. to SSG)		
CODE	NAME	BODY MAT.
454	BALL VALVE	AISI 304
2K4	BUTTERFLY VALVE	CARBON STEEL
1K4	KNIFE GATE VALVE	CARBON STEEL
11S4	SAMPLE VALVE	AISI 304
6S4	SWING CHECK VALVE	AISI 304
5S4	DISC CHECK VALVE	AISI 304
1S54	SAFETY VALVE	AISI 304

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W33	WATER, MECHANICALLY TREATED
G10	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D10	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, +0,5 MPa
S02	STEAM, LIVE, 0,5-1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MOFFIER
A108	ADHESIVE
A109	RELEASE
A110	BROKE

Pipe number
Dim. - Media code - Pipe specification

NOM FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)

20 / 4 / 505
(24 / 4 / 600)

CONNECTED TO DCS SYSTEM LOCAL

TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

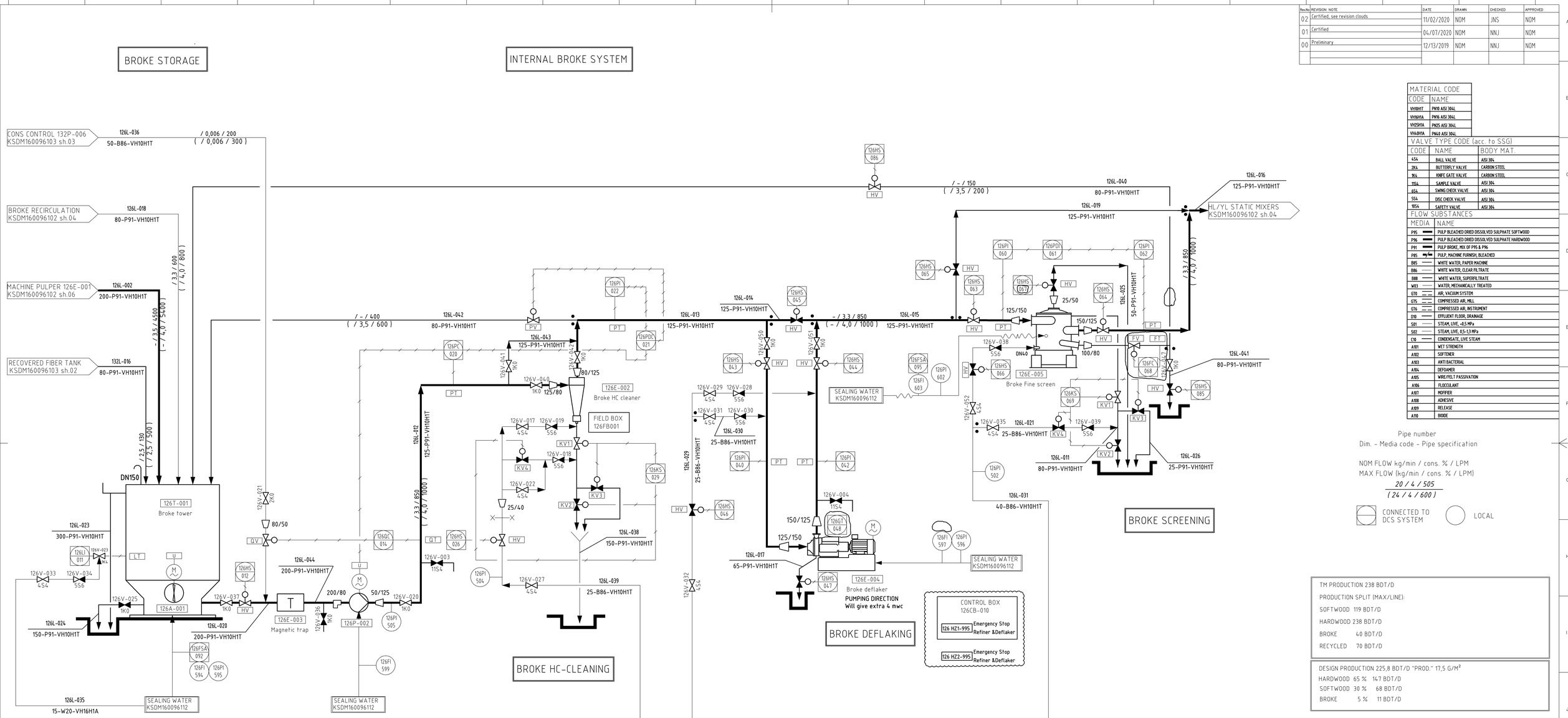
DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

ITEM NUMBER	126E-001	126P-001
TECHNICAL DATA	HP-33B1	ACP125-315.4F
l/min, bar	- l/min	5400 l/min
%-weight	4,5 %	4,0 %
t/d		30 m wc
DUTY, kW	Inst: 160 kW, 1500 rpm	Inst: kW, 1500 rpm

Valmet
Certified
Signature JNS
Date 11/02/2020

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.	
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: /	SCALE: 1:1	DRAWN: IDP — DATE: 03/20/2019
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: NNJ — DATE: 11/02/2020
TITLE: NEPTUNE			APPROVED: NOM — DATE: 11/02/2020
MACHINE BROKE PULPER SYSTEM			DOCUMENT ID: KSDM160096102 — SHEET: 6 / 7 — REVISION: 02
REASON FOR ISSUE: CERTIFIED			

A1+210



Rev.No	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
02	Certified, see revision clouds	11/02/2020	NOM	JNS	NOM
01	Certified	04/07/2020	NOM	NNJ	NOM
00	Preliminary	12/13/2019	NOM	NNJ	NOM

MATERIAL CODE	
CODE	NAME
VH10H1T	PN10 AISI 304L
VH16H1A	PN16 AISI 304L
VH25H1A	PN25 AISI 304L
VH40H1A	PN40 AISI 304L

VALVE TYPE CODE (acc. to SSG)		
CODE	NAME	BODY MAT.
4S4	BALL VALVE	AISI 304
2K4	BUTTERFLY VALVE	CARBON STEEL
1K4	KNIFE GATE VALVE	CARBON STEEL
11S4	SAMPLE VALVE	AISI 304
6S4	SWING CHECK VALVE	AISI 304
5S4	DISC CHECK VALVE	AISI 304
1S4	SAFETY VALVE	AISI 304

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W93	WATER, MECHANICALLY TREATED
G70	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D10	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, +0,5 MPa
S02	STEAM, LIVE, 0,5-1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MODIFIER
A108	ADHESIVE
A109	RELEASE
A110	BROKE

Pipe number
Dim. - Media code - Pipe specification

NOM FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)
20 / 4 / 505
(24 / 4 / 600)

CONNECTED TO DCS SYSTEM
LOCAL

TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 14.7 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

Valmet
Certified
Signature NOM
Date 11/02/2020

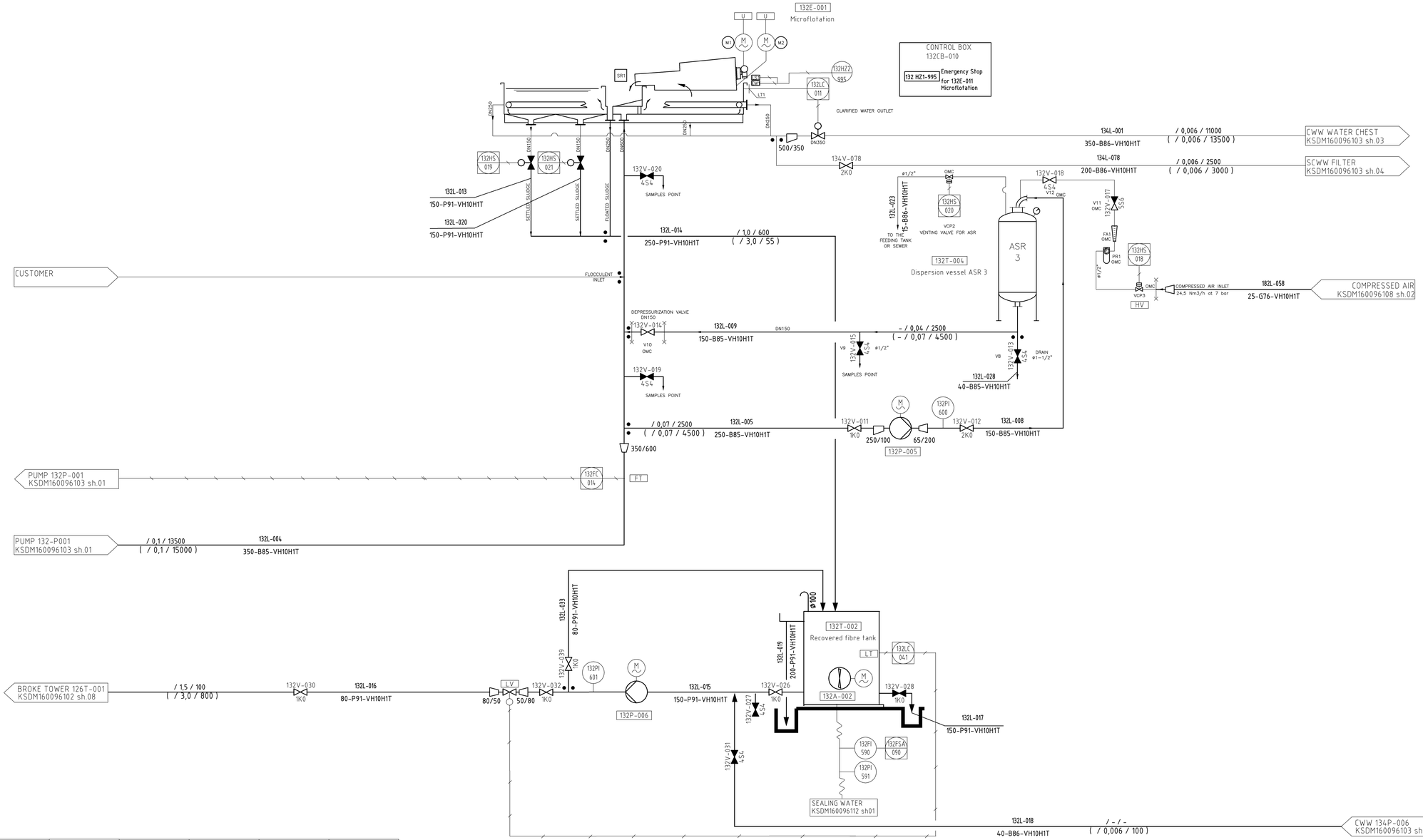
ITEM NUMBER	126T-001	126A-001	126E-002	126P-002	126E-003	126E-004	126E-005
TECHNICAL DATA l/min, bar %-weight t/d	 4,0 % 150 m³	SLF-80.11D - l/min 4,0 %	HC Cleaner150B - l/min 4 %	ACP50-315.6S 1000 l/min 3,5 % 55 m wc	T8	DF-0 - l/min 4 %	ProFS40 - l/min 4,0 %
DUTY, kW		Inst: kW, 1500 rpm	Inst: ,	Inst: kW, 1500 rpm	Inst: ,	Inst: kW, 1500 rpm	Inst: kW, 1500 rpm

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE / SYSTEM: AutoCAD
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.	
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: /	SCALE: 1:1	DRAWN: NorrmJo2 DATE: 12/10/2019
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: JNS DATE: 11/02/2020
TITLE: NEPTUNE INTERNAL BROKE SYSTEM			APPROVED: NOM DATE: 11/02/2020
REASON FOR ISSUE: CERTIFIED			DOCUMENT ID: KSDM160096102 SHEET: 7 / 7 REVISION: 02

A1+210

WHITE WATER SYSTEM

Rev.No	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
0.2	Certified, general revision	11/03/2020	NOM	JNS	NOM
0.1	Certified	04/07/2020	NOM	NNJ	NOM
0.0	Preliminary	12/13/2019	NOM	NNJ	NOM



FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W03	WATER, MECHANICALLY TREATED
G70	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D70	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, ~0,5 MPa
S02	STEAM, LIVE, 0,5~1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MOFFER
A108	ADHESIVE
A109	RELEASE
A110	BIOIDE

MAX FLOW kg/min / cons. % / LPM
NOM FLOW (kg/min / cons. % / LPM)

24 / 4 / 600
(20 / 4 / 505)

POSNR CONNECTED TO DCS SYSTEM
POSNR CONNECTED TO PLC SYSTEM
POSNR LOCAL

Pipe number
Dim. - Media code - Pipe specification

TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

Valmet
Certified
Signature NOM_____
Date 11/03/2020____

132E-001	132A-002	132T-002	132T-004	132P-005	132P-006
Deltafloat	SLR-50.5D	10 m³	3 m³	ACP100-500.4.S	ACP65-330.4.S
15000 l/min		3,5 %	0,006 %	6000 l/min	800 l/min
0,07 %	3,5 %			0,01 %	3 %
				62 m wc	22 m wc
Inst: 0,37 kW, 1500 rpm	Inst: 5,5 kW, 1500 rpm			Inst: 132 kW, 1500 rpm	Inst: 7,5 kW, 1500 rpm

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE		SYSTEM: AutoCAD
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.			
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: /	SCALE	DRAWN: JNS	DATE: 03/20/2019	
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: JNS	DATE: 11/03/2020	
TITLE: NEPTUNE WHITE WATER SYSTEM			APPROVED: NOM	DATE: 11/03/2020	
REASON FOR ISSUE: CERTIFIED			DOCUMENT ID: KSDM160096103	SHEET: 2/5	REVISION: 02

A1+210

CLARIFIED WHITE WATER SYSTEM

Rev.No	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
02	Certified, see revision clouds	11/03/2020	NOM	JNS	NOM
01	PG Added	04/07/2020	NOM	NNJ	NOM
00	Preliminary	12/13/2019	NOM	NNJ	NOM

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W93	WATER, MECHANICALLY TREATED
G70	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D10	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, <0,5 MPa
S02	STEAM, LIVE, 0,5-1,3 MPa
C10	CONDENSATE, LIVE STEAM
A103	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MODIFIER
A108	ADHESIVE
A109	RELEASE
A110	BIOIDE

MAX FLOW kg/min / cons. % / LPM
NOM FLOW (kg/min / cons. % / LPM)

24 / 4 / 600
(20 / 4 / 505)

CONNECTED TO DCS SYSTEM
CONNECTED TO PLC SYSTEM
LOCAL

TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

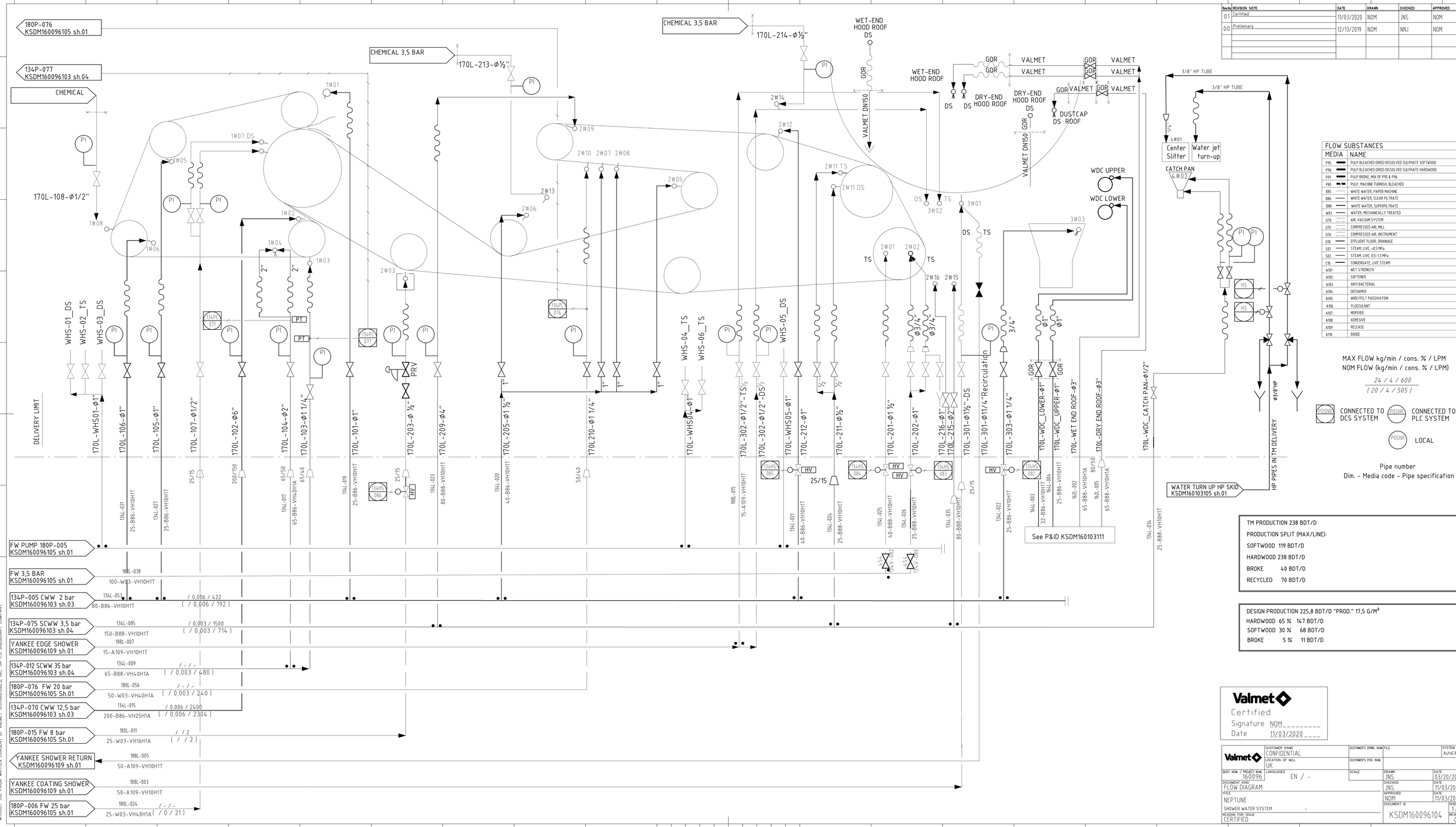
DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

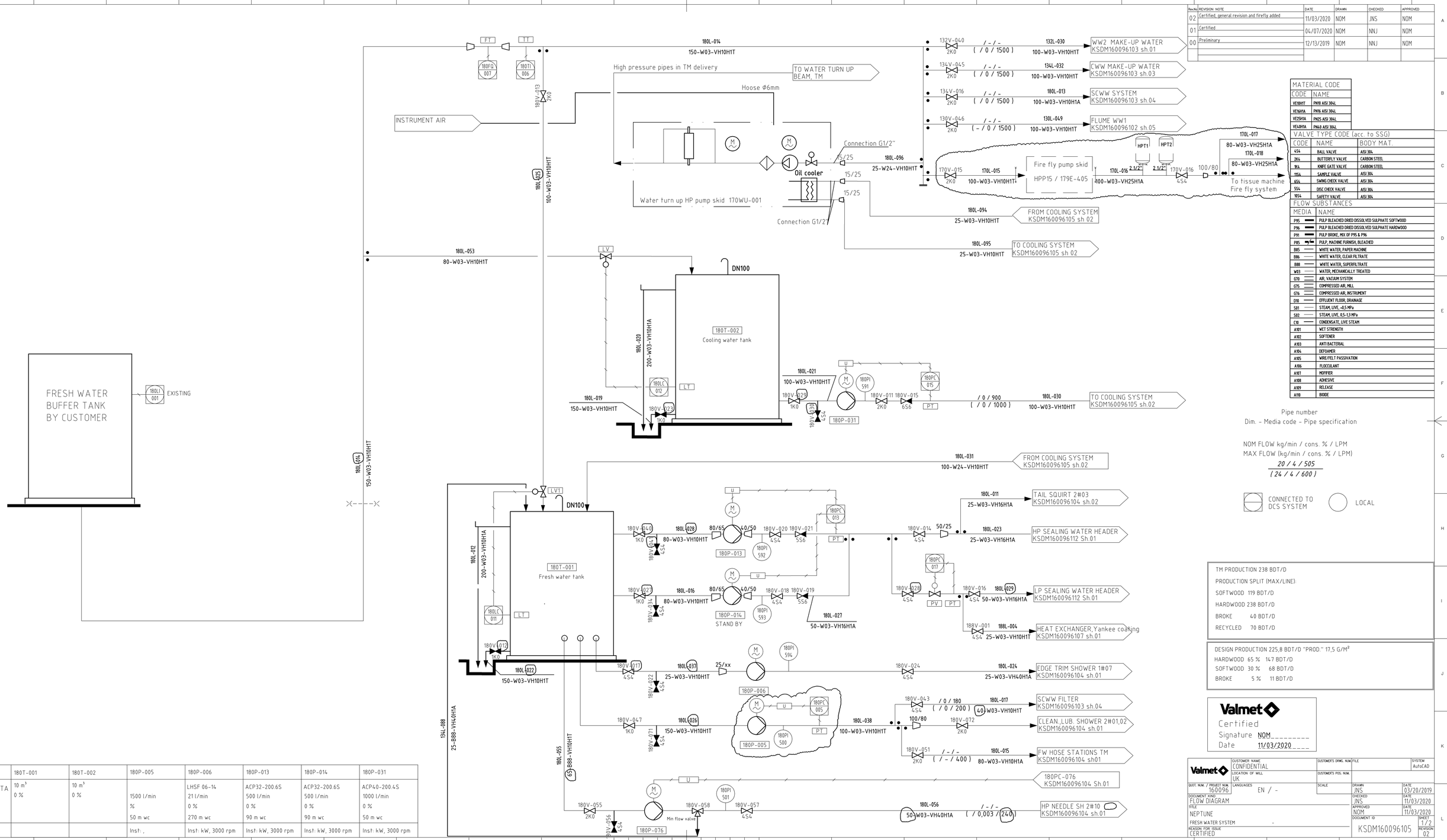
Valmet
Certified
Signature NOM
Date 04/07/2020

134T-001:1	134T-001:2	134T-001:3	134P-003	134P-004	134P-005	134P-006	134P-008	134P-070
100 m³ 0,006 %	100 m³ 0,006 %	100 m³ 0,006 %	ACP125-250.5S 5000 l/min 0,01 % 27 m wc	ACP125-315.4F 4500 l/min 0,01 % 30 m wc	ACP100-250.5S 4000 l/min 0,006 % 35 m wc	ACP100-250.5S 3000 l/min 0,006 % 32 m wc	ACP50-315.6S 1200 l/min 0,006 % 58 m wc	ACP100-315.6S HD 5300 l/min 0,006 % 145 m wc
			Inst: kW, 1500 rpm	Inst: 37 kW, 1500 rpm	Inst: 37 kW, 1500 rpm	Inst: 30 kW, 1500 rpm	Inst: 22 kW, 1500 rpm	Inst: kW, 3000 rpm

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE	SYSTEM: AutoCAD
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.		
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: EN / -	SCALE	DRAWN: JNS	DATE: 03/20/2019
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: JNS	DATE: 11/03/2020
TITLE: NEPTUNE WHITE WATER SYSTEM			APPROVED: NOM	DATE: 11/03/2020
REASON FOR ISSUE: CERTIFIED			DOCUMENT ID: KSDM160096103	SHEET: 3/5 REVISION: 02

A1+210


180P-076 KSDM160096105 sh.01
134P-077 KSDM160096103 sh.04
CHEMICAL
CHEMICAL 3,5 BAR
170L-213-Ø½"
CHEMICAL 3,5 BAR
170L-214-Ø½"
170L-108-Ø1/2"
WET-END HOOD ROOF DS
WET-END HOOD ROOF
DRY-END HOOD ROOF
DRY-END HOOD ROOF DS
DUSTCAP DS ROOF
VALMET DN150
GOR
VALMET
DS
TS
WDC UPPER
WDC LOWER
3/8" HP TUBE
CATCH PAN
Center Slitter
Water jet turn-up
WHS-01_DS
WHS-02_TS
WHS-03_DS
WHS-04_TS
WHS-06_TS
WHS-05_DS
PRV
DELIVERY LIMIT
170L-WHS01-Ø1"
170L-106-Ø1"
170L-105-Ø1"
170L-107-Ø1/2"
170L-102-Ø6"
170L-104-Ø2"
170L-103-Ø1 1/4"
170L-101-Ø1"
170L-203-Ø ½"
170L-209-Ø4"
170L-205-Ø1 ½"
170L210-Ø1 1/4"
170L-WHS04-Ø1"
170L-302-Ø1/2"-TS½
170L-302-Ø1/2-DS½
170L-WHS05-Ø1"
170L-212-Ø1"
170L-211-Ø½"
170L-201-Ø1 ½"
170L-202-Ø1"
170L-216-Ø1"
170L-215-Ø2"
170L-301-Ø1½"-DS
170L-301-Ø11/4"Recirculatiin
170L-303-Ø1 1/4"
170L-WDC_LOWER-Ø1"
170L-WDC_UPPER-Ø1"
170L-WET END ROOF-Ø3"
170L-DRY END ROOF-Ø3"
170L-WDC_CATCH PAN-Ø1/2"
Ø3/8"HP
HP PIPES IN TM DELIVERY
WATER TURN UP HP SKID KSDM160103105 sh.01
See P&ID KSDM160103111
FW PUMP 180P-005 KSDM160096105 sh.01
FW 3,5 BAR KSDM160096105 sh.01
134P-005 CWW 2 bar KSDM160096103 sh.03
134P-075 SCWW 3,5 bar KSDM160096103 sh.04
YANKEE EDGE SHOWER KSDM160096109 sh.01
134P-012 SCWW 35 bar KSDM160096103 sh.04
180P-076 FW 20 bar KSDM160096105 Sh.01
134P-070 CWW 12,5 bar KSDM160096103 sh.03
180P-015 FW 8 bar KSDM160096105 Sh.01
YANKEE SHOWER RETURN KSDM160096109 sh.01
YANKEE COATING SHOWER KSDM160096109 sh.01
180P-006 FW 25 bar KSDM160096105 sh.01
1#01
1#02
1#03
1#04
1#06
1#07 DS
1#08
2#01
2#02
2#03
2#05
2#06
2#08
2#09
2#10
2#11 TS
2#11 DS
2#12
2#13
2#14
2#15
2#16
3#01
3#02
3#03
4#01
4#02
PI
PT
HV
HS
2"
1"
3/4"
Ø3/4
Ø1"
1/4"
½"
134PI 076
134PI 077
134HS 085
134HS 084
134HS 083
134HS 082
134HS 086
25/15
200/150
65/50
65/40
50/40
80/50
80/40
45°
134V-002
134V-001
134V-003
134V-004
134V-005
134V-006
25-B86-VH10H1T
25-B88-VH10H1T
65-B88-VH10H1A
40-B86-VH10H1T
40-B88-VH10H1T
80-B88-VH10H1T
50-W03-VH40H1A
100-W03-VH10H1T
80-B86-VH10H1T
150-B88-VH10H1T
15-A109-VH10H1T
65-B88-VH40H1A
200-B86-VH25H1A
25-W03-VH16H1A
50-A109-VH10H1T
134L-031
134L-027
134L-019
134L-020
134L-021
134L-023
134L-024
134L-025
134L-026
134L-035
134L-022
134L-003
134L-004
134L-034
162L-002
162L-005
188L-095
188L-038
188L-052
188L-085
188L-007
188L-009
188L-056
188L-015
188L-011
188L-005
188L-003
188L-024
/ 0,006 / 422
(/ 0,006 / 192)
/ 0,003 / 1500
(/ 0,003 / 714)
/ - / -
(/ 0,003 / 480)
(/ 0,003 / 240)
/ 0,006 / 2400
(/ 0,006 / 2304)
/ / 2
(/ / 2)
(/ 0 / 21)
FLOW SUBSTANCES
MEDIA NAME
P95 PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96 PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91 PULP BRIDE_MIX OF P95 & P96
P85 PULP, MACHINE FURNISH, BLEACHED
B85 WHITE WATER, PAPER MACHINE
B86 WHITE WATER, CLEAR FILTRATE
B88 WHITE WATER, SUPERFILTRATE
W03 WATER, MECHANICALLY TREATED
G70 AIR, VACUUM SYSTEM
G75 COMPRESSED AIR, MILL
G76 COMPRESSED AIR, INSTRUMENT
D19 EFFLUENT FLOOR, DRAINAGE
S01 STEAM, LIVE, +0,5 MPa
S02 STEAM, LIVE, 0,5-1,3 MPa
C10 CONDENSATE, LIVE STEAM
A101 WET STRENGTH
A102 SOFTENER
A103 ANTI BACTERIAL
A104 DEFOAMER
A105 WIRE/FELT PASSIVATION
A106 FLOCCULANT
A107 MOFFIER
A108 ADHESIVE
A109 RELEASE
A110 BIOIDE
MAX FLOW kg/min / cons. % / LPM
NOM FLOW (kg/min / cons. % / LPM)
24 / 4 / 600
(20 / 4 / 505)
POS.NR CONNECTED TO DCS SYSTEM
POS.NR CONNECTED TO PLC SYSTEM
POS.NR LOCAL
Pipe number
Dim. – Media code – Pipe specification
TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D
DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D
Valmet
Certified
Signature NOM
Date 11/03/2020
Rev.No REVISION NOTE DATE DRAWN CHECKED APPROVED
01 Certified 11/03/2020 NOM JNS NOM
00 Preliminary 12/13/2019 NOM NNJ NOM
CUSTOMER NAME CONFIDENTIAL
LOCATION OF MILL UK
CUSTOMER'S DRWG. NUM.
CUSTOMER'S POS. NUM.
FILE
SYSTEM AutoCAD
QUOT. NUM. / PROJECT NUM. 160096
LANGUAGES EN / -
SCALE
DRAWN JNS DATE 03/20/2019
DOCUMENT KIND FLOW DIAGRAM
CHECKED JNS DATE 11/03/2020
TITLE NEPTUNE
SHOWER WATER SYSTEM -
APPROVED NOM DATE 11/03/2020
REASON FOR ISSUE CERTIFIED
DOCUMENT ID KSDM160096104
SHEET 1 / 1
REVISION 01
A1+210
THE INFORMATION CONTAINED HEREIN CONSTITUTES CONFIDENTIAL INFORMATION PROPRIETARY TO VALMET TECHNOLOGIES, INC. AND/OR ANY SUBSIDIARY COMPANY THEREOF, AND SHALL NOT BE REPRODUCED IN ANY MANNER OR DISCLOSED TO ANY PERSON OR ENTITY WITHOUT THE PRIOR WRITTEN CONSENT OF VALMET.



Rev.No	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
02	Certified, general revision and firefly added	11/03/2020	NOM	JNS	NOM
01	Certified	04/07/2020	NOM	NNJ	NOM
00	Preliminary	12/13/2019	NOM	NNJ	NOM

MATERIAL CODE	
CODE	NAME
VE1DH1T	PN10 AISI 304L
VE1GH1A	PN16 AISI 304L
VE2SH1A	PN25 AISI 304L
VE4DH1A	PN40 AISI 304L

VALVE TYPE CODE (acc. to SSG)		
CODE	NAME	BODY MAT.
454	BALL VALVE	AISI 304
2K4	BUTTERFLY VALVE	CARBON STEEL
1K4	KNIFE GATE VALVE	CARBON STEEL
1S54	SAMPLE VALVE	AISI 304
6S4	SWING CHECK VALVE	AISI 304
5S4	DISC CHECK VALVE	AISI 304
1S54	SAFETY VALVE	AISI 304

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W03	WATER, MECHANICALLY TREATED
G10	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D10	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, +0,5 MPa
S02	STEAM, LIVE, 0,5-1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MOFFIER
A108	ADHESIVE
A109	RELEASE
A110	BIOCIDE

Pipe number
Dim. - Media code - Pipe specification

NOM FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)
20 / 4 / 505
(24 / 4 / 600)

CONNECTED TO DCS SYSTEM
LOCAL

TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

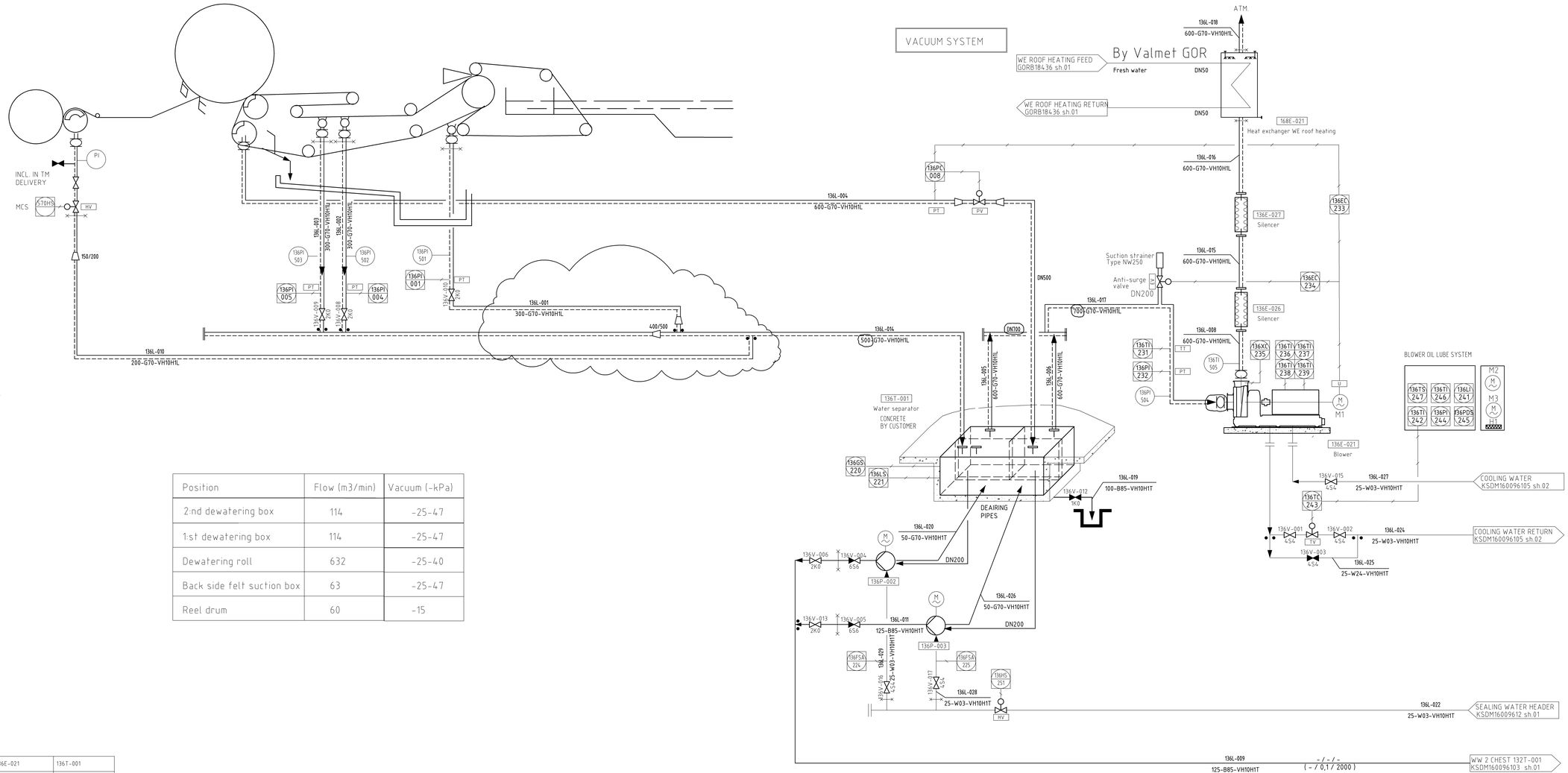
DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

Valmet
Certified
Signature NOM
Date 11/03/2020

ITEM NUMBER	180T-001	180T-002	180P-005	180P-006	180P-013	180P-014	180P-031
TECHNICAL DATA	10 m³	10 m³		LHSF 06-14	ACP32-200.6S	ACP32-200.6S	ACP40-200.4S
l/min, bar	0 %	0 %	1500 l/min	21 l/min	500 l/min	500 l/min	1000 l/min
%-weight			%	0 %	0 %	0 %	0 %
t/d			50 m wc	270 m wc	90 m wc	90 m wc	50 m wc
DUTY, kW			Inst: ,	Inst: kW, 3000 rpm	Inst: kW, 3000 rpm	Inst: kW, 3000 rpm	Inst: kW, 3000 rpm

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.	SYSTEM: AutoCAD
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: EN / -	SCALE	DRAWN: JNS 03/20/2019
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: JNS 11/03/2020
TITLE: NEPTUNE			APPROVED: NOM 11/03/2020
FRESH WATER SYSTEM -			DOCUMENT ID: KSDM160096105 SHEET 1/2 REVISION 02
REASON FOR ISSUE: CERTIFIED			

A1+210



Position	Flow (m3/min)	Vacuum (-kPa)
2:nd dewatering box	114	-25-47
1:st dewatering box	114	-25-47
Dewatering roll	632	-25-40
Back side felt suction box	63	-25-47
Reel drum	60	-15

136E-021	136T-001
RT 71-1 923 m³/min - %	- l/min - %
Inst: kW, 1500 rpm	Inst: ,

Mark	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
02	Certified, see revision clouds	11/03/2020	NOM	JNS	NOM
01	Certified	04/07/2020	NOM	NNJ	NOM
00	Preliminary	12/13/2019	NOM	NNJ	NOM

MATERIAL CODE	
CODE	NAME
VH10HT	PN10 AISI 304
VH16HA	PN16 AISI 304
VH25HA	PN25 AISI 304
VH40HA	PN40 AISI 304

VALVE TYPE CODE (acc. to SSG)		
CODE	NAME	BODY MAT.
454	BALL VALVE	AISI 304
2K4	BUTTERFLY VALVE	CARBON STEEL
9S4	KNIFE GATE VALVE	CARBON STEEL
1S4	SAMPLE VALVE	AISI 304
6S4	SWING CHECK VALVE	AISI 304
5S4	DISC CHECK VALVE	AISI 304
9S4	SAFETY VALVE	AISI 304

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W03	WATER, MECHANICALLY TREATED
G70	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D10	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, <0,5 MPa
S02	STEAM, LIVE, 0,5-1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MODIFIER
A108	ADHESIVE
A109	RELEASE
A110	BIOCIDE

Pipe number
Dim. - Media code - Pipe specification

NOM FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)
20 / 4 / 505
(24 / 4 / 600)

CONNECTED TO DCS SYSTEM
LOCAL

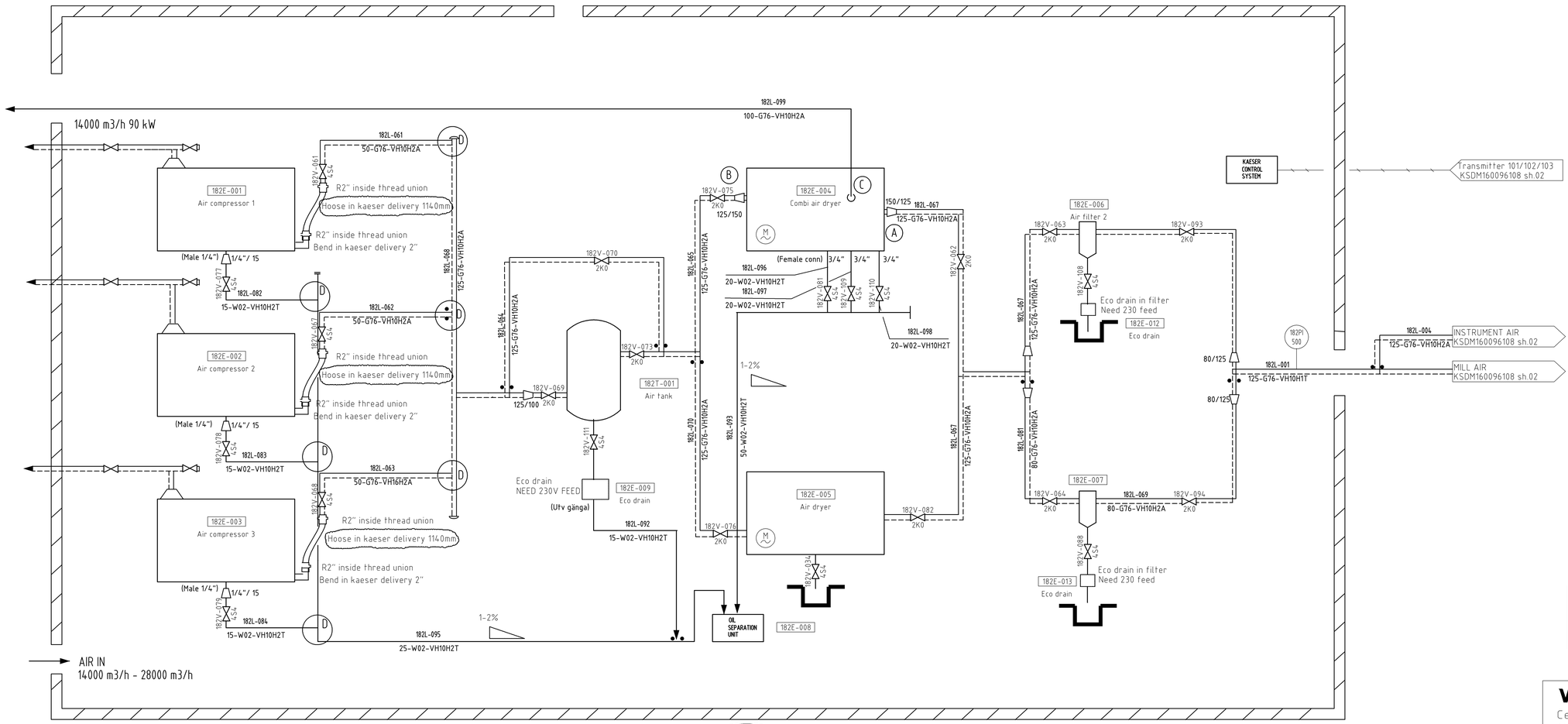
TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

Valmet
Certified
Signature NOM
Date 11/03/2020

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DRWG. NUM./FILE:	SYSTEM: AutoCAD
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.:	
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: EN / -	SCALE:	DRAWN: JNS — DATE: 03/20/2019
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: JNS — DATE: 11/03/2020
TITLE: NEPTUNE VACUUM SYSTEM -			APPROVED: NOM — DATE: 11/03/2020
REASON FOR ISSUE: CERTIFIED		DOCUMENT ID: KSDM160096106	SHEET: 1 / 1 — REVISION: 02

Rev.No	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
0.2	Certified, general revision	11/05/2020	NOM	JNS	NOM
0.1	Certified	04/07/2020	NOM	NNJ	NOM
0.0	Preliminary	12/13/2019	NOM	NNJ	NOM



VALVE TYPE CODE (acc. to SSG)		
CODE	NAME	BODY MAT.
4S4	BALL VALVE	AISI 304
2K4	BUTTERFLY VALVE	CARBON STEEL
9K4	KNIFE GATE VALVE	CARBON STEEL
11S4	SAMPLE VALVE	AISI 304
6S4	SWING CHECK VALVE	AISI 304
5S4	DISC CHECK VALVE	AISI 304
16S4	SAFETY VALVE	AISI 304
FLOW SUBSTANCES		
MEDIA	NAME	
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD	
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD	
P91	PULP BROKE, MIX OF P95 & P96	
P85	PULP, MACHINE FURNISH, BLEACHED	
B85	WHITE WATER, PAPER MACHINE	
B86	WHITE WATER, CLEAR FILTRATE	
B88	WHITE WATER, SUPERFILTRATE	
W03	WATER, MECHANICALLY TREATED	
G70	AIR, VACUUM SYSTEM	
G75	COMPRESSED AIR, MILL	
G76	COMPRESSED AIR, INSTRUMENT	
D10	EFFLUENT FLOOR, DRAINAGE	
S01	STEAM, LIVE, <0.5 MPa	
S02	STEAM, LIVE, 0.5-1.3 MPa	
C10	CONDENSATE, LIVE STEAM	
A101	WET STRENGTH	
A102	SOFTENER	
A103	ANTI BACTERIAL	
A104	DEFOAMER	
A105	WIRE/FELT PASSIVATION	
A106	FLOCCULANT	
A107	MODIFIER	
A108	ADHESIVE	
A109	RELEASE	
A110	BIOCIDE	

DESIGN FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)
- 20 / 4 / 505
- (24 / 4 / 600)

KRETS POSNR CONNECTED TO DCS SYSTEM
KRETS POSNR CONNECTED TO PLC SYSTEM
KRETS POSNR LOCAL

TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

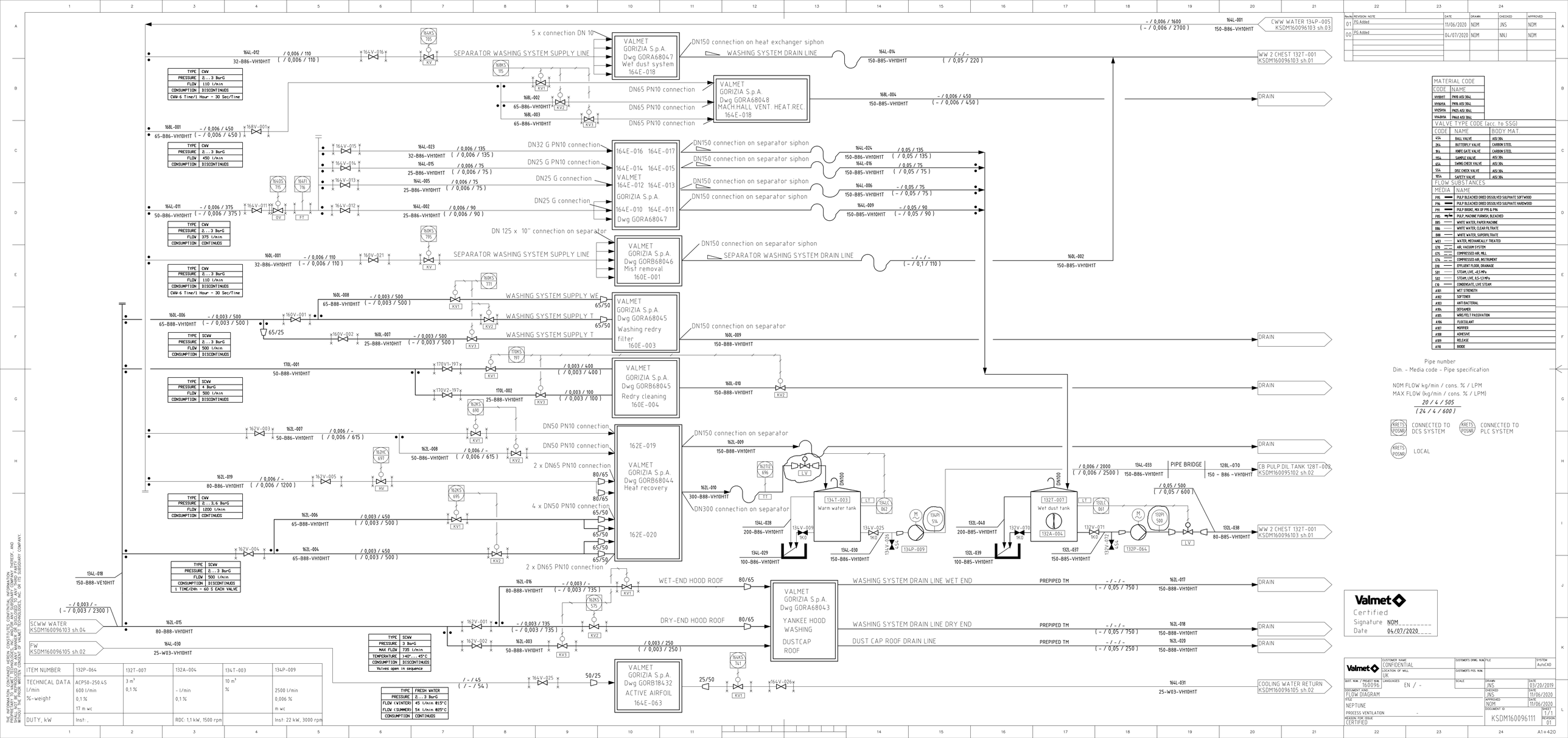
DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

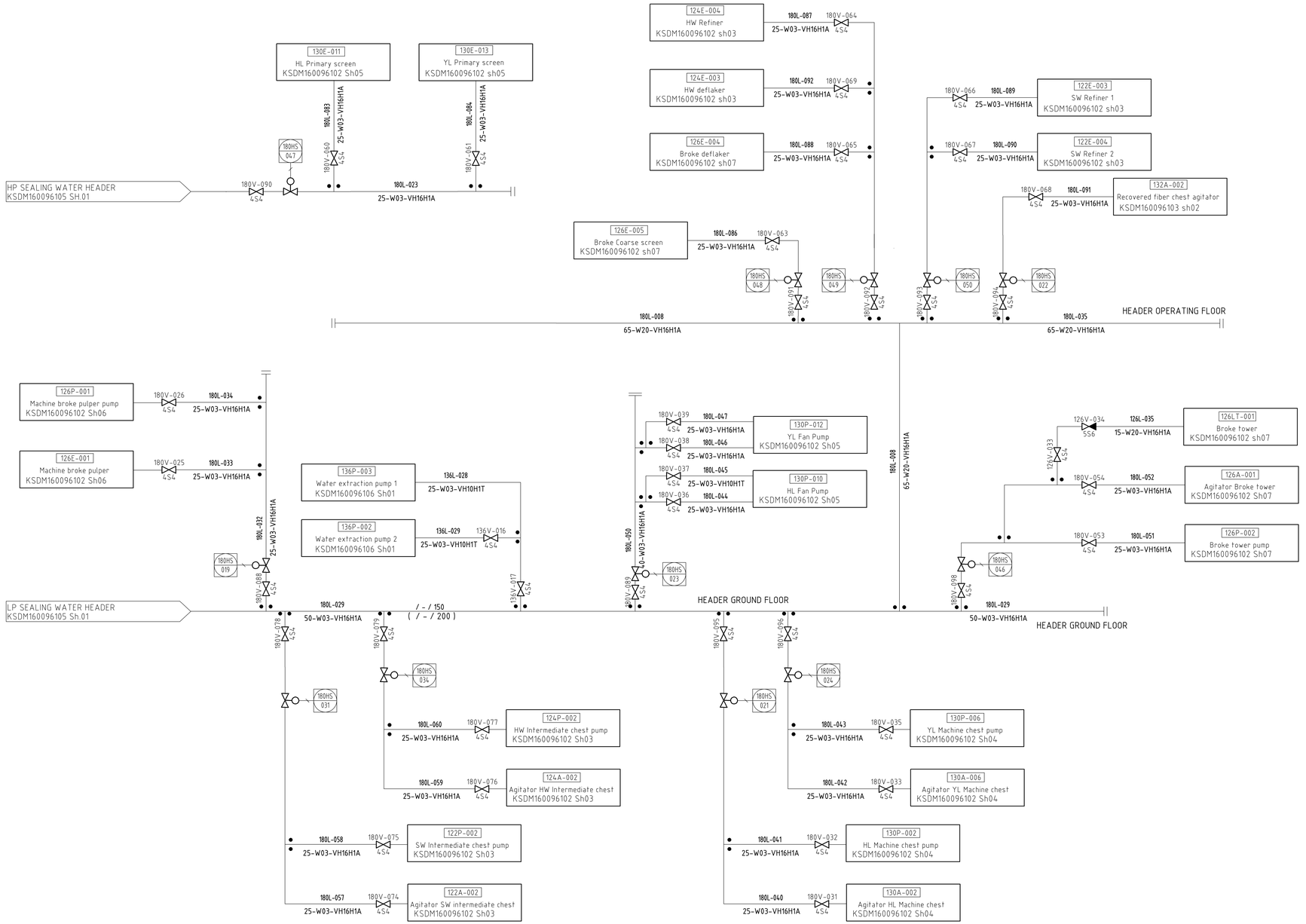
Valmet
Certified
Signature NOM
Date 11/05/2020

182E-001	182E-002	182E-003	182E-004	182E-006	182E-007	182E-008	182E-009	182T-001
CSDX165 16,16 m³/min - %	CSDX165 16,16 m³/min - %	CSDX165 16,16 m³/min - %	DDI334/555 33,3 m³/min - %	F320KE	F320KE	Aquamat CF75	Eco drain 14 l/min %	
Inst:,	Inst:,	Inst:,	Inst:,	Inst:,	Inst:,	Inst:,	Inst:,	Inst:,

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.	SYSTEM: AutoCAD
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: EN / -	SCALE	DRAWN: JNS — DATE: 03/20/2019
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: JNS — DATE: 11/05/2020
TITLE: NEPTUNE			APPROVED: NOM — DATE: 11/05/2020
MILL AIR SYSTEM	-		DOCUMENT ID: KSDM160096108 — SHEET: 1/2 — REVISION: 02
REASON FOR ISSUE: CERTIFIED			

A1+210


5 x connection DN 10
VALMET GORIZIA S.p.A. Dwg GORA68047 Wet dust system 164E-018
SEPARATOR WASHING SYSTEM SUPPLY LINE
DN150 connection on heat exchanger siphon
WASHING SYSTEM DRAIN LINE
CWW WATER 134P-005 KSDM160096103 sh.03
WW 2 CHEST 132T-001 KSDM160096103 sh.01
DRAIN
DN65 PN10 connection
DN65 PN10 connection
DN65 PN10 connection
VALMET GORIZIA S.p.A. Dwg GORA68048 MACH.HALL VENT. HEAT.REC 164E-018
DN32 G PN10 connection
DN25 G PN10 connection
DN25 G connection
DN25 G connection
164E-016 164E-017
164E-014 164E-015
VALMET 164E-012 164E-013
GORIZIA S.p.A.
164E-010 164E-011
Dwg GORA68047
DN150 connection on separator siphon
DN150 connection on separator siphon
DN150 connection on separator siphon
DN150 connection on separator siphon
DN 125 x 10" connection on separator
VALMET GORIZIA S.p.A. Dwg GORB68046 Mist removal 160E-001
SEPARATOR WASHING SYSTEM SUPPLY LINE
DN150 connection on separator siphon
SEPARATOR WASHING SYSTEM DRAIN LINE
WASHING SYSTEM SUPPLY WE
WASHING SYSTEM SUPPLY T
WASHING SYSTEM SUPPLY T
VALMET GORIZIA S.p.A. Dwg GORA68045 Washing redry filter 160E-003
DN150 connection on separator
VALMET GORIZIA S.p.A. Dwg GORB68045 Redry cleaning 160E-004
DN50 PN10 connection
DN50 PN10 connection
2 x DN65 PN10 connection
4 x DN50 PN10 connection
2 x DN65 PN10 connection
162E-019
VALMET GORIZIA S.p.A. Dwg GORB68044 Heat recovery
162E-020
DN150 connection on separator
DN300 connection on separator
Warm water tank
Wet dust tank
PIPE BRIDGE
CB PULP DIL TANK 128T-003 KSDM160095102 sh.02
WET-END HOOD ROOF
DRY-END HOOD ROOF
VALMET GORIZIA S.p.A. Dwg GORA68043 YANKEE HOOD WASHING DUSTCAP ROOF
WASHING SYSTEM DRAIN LINE WET END
WASHING SYSTEM DRAIN LINE DRY END
DUST CAP ROOF DRAIN LINE
VALMET GORIZIA S.p.A. Dwg GORB18432 ACTIVE AIRFOIL 164E-063
COOLING WATER RETURN KSDM160096105 sh.02
SCWW WATER KSDM160096103 sh.04
FW KSDM160096105 sh.02
TYPE CWW PRESSURE 2...3 BarG FLOW 110 l/min CONSUMPTION DISCONTINUOS CWW-6 Time/1 Hour - 30 Sec/Time
TYPE CWW PRESSURE 2...3 BarG FLOW 450 l/min CONSUMPTION DISCONTINUOS
TYPE CWW PRESSURE 2...3 BarG FLOW 375 l/min CONSUMPTION CONTINUOS
TYPE CWW PRESSURE 2...3 BarG FLOW 110 l/min CONSUMPTION DISCONTINUOS CWW-6 Time/1 Hour - 30 Sec/Time
TYPE SCWW PRESSURE 2...3 BarG FLOW 500 l/min CONSUMPTION DISCONTINUOS
TYPE SCWW PRESSURE 4 BarG FLOW 500 l/min CONSUMPTION DISCONTINUOS
TYPE CWW PRESSURE 2...3,6 BarG FLOW 1200 l/min CONSUMPTION CONTINUOS
TYPE SCWW PRESSURE 2...3 BarG FLOW 500 l/min CONSUMPTION DISCONTINUOS 1 TIME/24h - 60 S EACH VALVE
TYPE SCWW PRESSURE 3 BarG MAX FLOW 735 l/min TEMPERATURE >40°...45°C CONSUMPTION DISCONTINUOS Valves open in sequence
TYPE FRESH WATER PRESSURE 2...3 BarG FLOW (WINTER) 45 l/min @15°C FLOW (SUMMER) 54 l/min @25°C CONSUMPTION CONTINUOS
ITEM NUMBER | 132P-064 | 132T-007 | 132A-004 | 134T-003 | 134P-009
TECHNICAL DATA | ACP50-250.4S | 3 m³ | | 10 m³ |
l/min | 600 l/min | 0,1 % | - l/min | % | 2500 l/min
%-weight | 0,1 % | | 0,1 % | | 0,006 %
| 17 m wc | | | | m wc
DUTY, kW | Inst: . | | RDC: 1,1 kW, 1500 rpm | | Inst: 22 kW, 3000 rpm
MATERIAL CODE
CODE | NAME
VHNBRT PN10 ASG 304L
VHNSPA PN16 ASG 304L
VHCSHA PN25 ASG 304L
VHJSPA PN40 ASG 304L
VALVE TYPE CODE (acc. to SSG)
CODE | NAME | BODY MAT.
434 BALL VALVE ASG 304
2K4 BUTTERFLY VALVE CARBON STEEL
90A KNIFE GATE VALVE CARBON STEEL
1P04 SAMPLE VALVE ASG 304
654 SWING CHECK VALVE ASG 304
554 DISC CHECK VALVE ASG 304
9S4 SAFETY VALVE ASG 304
FLOW SUBSTANCES
MEDIA | NAME
P95 PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96 PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91 PULP BROKE, MIX OF P95 & P96
P85 PULP, MACHINE FURNISH, BLEACHED
BB5 WHITE WATER, PAPER MACHINE
BBA WHITE WATER, CLEAR FILTRATE
BBB WHITE WATER, SUPERFILTRATE
W03 WATER, MECHANICALLY TREATED
G70 AIR, VACUUM SYSTEM
G75 COMPRESSED AIR, MILL
G76 COMPRESSED AIR, INSTRUMENT
D10 EFFLUENT FLOOR, DRAINAGE
S01 STEAM, LIVE, 4,5 MPa
S02 STEAM, LIVE, 6,5-13 MPa
C10 CONDENSATE, LIVE STEAM
A101 WET STRENGTH
A102 SOFTENER
A103 ANTI BACTERIAL
A104 DEFOAMER
A105 WIRE/FELT PASSIVATION
A106 FLOCCULANT
A107 MODIFIER
A108 ADHESIVE
A109 RELEASE
A110 BIOCIDE
Pipe number
Dim. - Media code - Pipe specification
NOM FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)
20 / 4 / 505
(24 / 4 / 600)
KNETS POSNR CONNECTED TO DCS SYSTEM
KNETS POSNR CONNECTED TO PLC SYSTEM
KNETS POSNR LOCAL
Valmet Certified Signature NOM Date 04/07/2020
Rev.No. | REVISION NOTE | DATE | DRAWN | CHECKED | APPROVED
01 | PG Added | 11/06/2020 | NOM | JNS | NOM
00 | PG Added | 04/07/2020 | NOM | NNJ | NOM
CUSTOMER NAME CONFIDENTIAL | CUSTOMER'S ORIG. NUM./FILE | SYSTEM AutoCAD
LOCATION OF MILL UK | CUSTOMER'S POS. NUM.
QUOT. NUM. / PROJECT NUM. 160096 | LANGUAGES EN / - | SCALE | DRAWN JNS | DATE 03/20/2019
DOCUMENT KIND FLOW DIAGRAM | CHECKED JNS | DATE 11/06/2020
TITLE NEPTUNE | APPROVED NOM | DATE 11/06/2020
PROCESS VENTILATION - | DOCUMENT ID KSDM160096111 | SHEET 1/1 | REVISION 01
REASON FOR ISSUE CERTIFIED
A1+420
THE INFORMATION CONTAINED HEREIN CONSTITUTES CONFIDENTIAL INFORMATION PROPRIETARY TO VALMET TECHNOLOGIES, INC. AND/OR ANY SUBSIDIARY COMPANY THEREOF, AND IS DISCLOSED SUBJECT TO THE EXPRESS RESTRICTION THAT IT SHALL NOT BE USED OR DISCLOSED WITHOUT THE PRIOR WRITTEN CONSENT OF VALMET TECHNOLOGIES, INC. OR ITS SUBSIDIARY COMPANY, AS THE CASE MAY BE.



01	Certified	11/09/2020	NOM	JNS	NOM
00	Preliminary	04/14/2020	NOM	NNJ	NOM

MATERIAL CODE	
CODE	NAME
VH10HT	PN10 AISI 304L
VH16HA	PN16 AISI 304L
VH25HA	PN25 AISI 304L
VH40HA	PN40 AISI 304L

VALVE TYPE CODE (acc. to SSG)		
CODE	NAME	BODY MAT.
454	BALL VALVE	AISI 304
2K4	BUTTERFLY VALVE	CARBON STEEL
9K4	KNIFE GATE VALVE	CARBON STEEL
9S4	SAMPLE VALVE	AISI 304
6S4	SWING CHECK VALVE	AISI 304
5S4	DISC CHECK VALVE	AISI 304
9S4	SAFETY VALVE	AISI 304

FLOW SUBSTANCES	
MEDIA	NAME
P95	PULP BLEACHED DRIED DISSOLVED SULPHATE SOFTWOOD
P96	PULP BLEACHED DRIED DISSOLVED SULPHATE HARDWOOD
P91	PULP BROKE, MIX OF P95 & P96
P85	PULP, MACHINE FURNISH, BLEACHED
B85	WHITE WATER, PAPER MACHINE
B86	WHITE WATER, CLEAR FILTRATE
B88	WHITE WATER, SUPERFILTRATE
W93	WATER, MECHANICALLY TREATED
G70	AIR, VACUUM SYSTEM
G75	COMPRESSED AIR, MILL
G76	COMPRESSED AIR, INSTRUMENT
D70	EFFLUENT FLOOR, DRAINAGE
S01	STEAM, LIVE, <0,5 MPa
S02	STEAM, LIVE, 0,5-1,3 MPa
C10	CONDENSATE, LIVE STEAM
A101	WET STRENGTH
A102	SOFTENER
A103	ANTI BACTERIAL
A104	DEFOAMER
A105	WIRE/FELT PASSIVATION
A106	FLOCCULANT
A107	MOFFIER
A108	ADHESIVE
A109	RELEASE
A110	BIOCIDE

Pipe number
Dim. - Media code - Pipe specification

NOM FLOW kg/min / cons. % / LPM
MAX FLOW (kg/min / cons. % / LPM)
20 / 4 / 505
(24 / 4 / 600)

CONNECTED TO DCS SYSTEM
CONNECTED TO PLC SYSTEM
LOCAL

TM PRODUCTION 238 BDT/D
PRODUCTION SPLIT (MAX/LINE):
SOFTWOOD 119 BDT/D
HARDWOOD 238 BDT/D
BROKE 40 BDT/D
RECYCLED 70 BDT/D

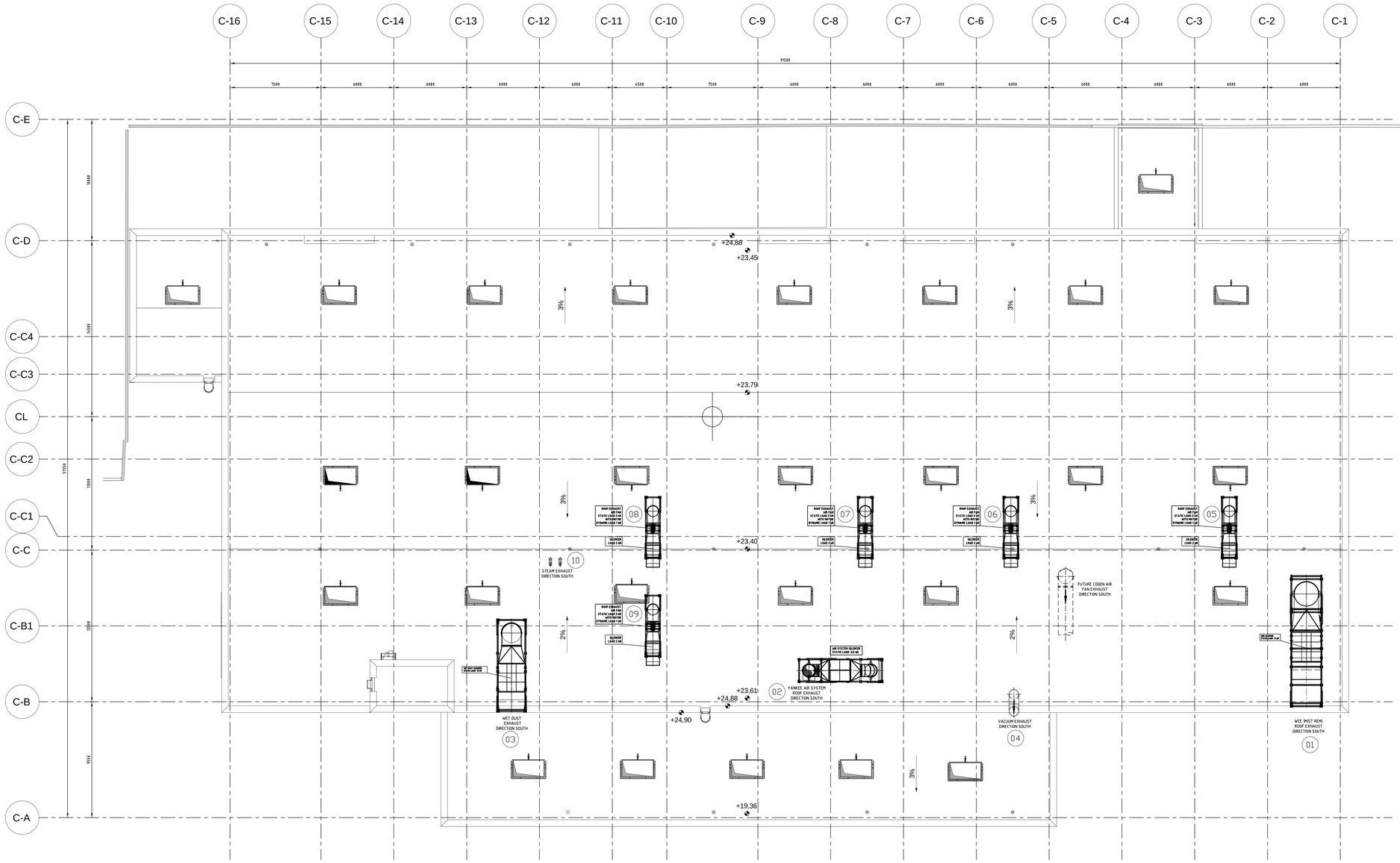
DESIGN PRODUCTION 225,8 BDT/D "PROD." 17,5 G/M²
HARDWOOD 65 % 147 BDT/D
SOFTWOOD 30 % 68 BDT/D
BROKE 5 % 11 BDT/D

Valmet
Certified
Signature NOM
Date 11/09/2020

Valmet	CUSTOMER NAME: CONFIDENTIAL	CUSTOMER'S DWG. NUM.	FILE / SYSTEM: AutoCAD
	LOCATION OF MILL: UK	CUSTOMER'S POS. NUM.	
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: EN / -	SCALE	DRAWN: JNS / DATE: 11/09/2020
DOCUMENT KIND: FLOW DIAGRAM			CHECKED: JNS / DATE: 11/09/2020
TITLE: NEPTUNE			APPROVED: NOM / DATE: 11/09/2020
SEALING WATER SYSTEM -			DOCUMENT ID: KSDM160096112 / SHEET: 1 / 1 / REVISION: 01
REASON FOR ISSUE: PRELIMINARY			

A1+210

Rev.No	REVISION NOTE	DATE	DRAWN	CHECKED	APPROVED
–	–	–	–	–	–



EMISSIONS AND NOISE

ITEM	TYPE	H (m)	Flow [m3/s]	Noise	Emissions [ppm]
01	WEE (MIST)	3	42	80 dB(A)	5
02	YANKEE HOOD AIR SYST	6	21	80 dB(A)	5
03	AWDR (DUST)	3	23	80 dB(A)	5
04	VACUUM SYSTEM	3	20	85 dB(A)	
05	MACHINE HALL EXHAUST (Roof exhaust)	2	12	80 dB(A)	
06	MACHINE HALL EXHAUST (Roof exhaust)	2	12	80 dB(A)	
07	MACHINE HALL EXHAUST (Roof exhaust)	2	12	80 dB(A)	
08	MACHINE HALL EXHAUST (Roof exhaust)	2	12	80 dB(A)	
09	MACHINE HALL EXHAUST (Roof exhaust)	2	12	80 dB(A)	
10	STEAM EXHAUST	3	15	85 dB(A)	

H = Exhaust level Height over roof

Valmet
PRELIMINARY
Signature LRK
Date 2019-11-19

IMPORTANT: DEPARTMENT LAYOUT NOT TO BE USED FOR DETAILED DESIGN. ONLY TO BE USED AS A "MAP" FOR THE PLANT.

Valmet	CUSTOMER NAME: WEPA NEPTUNE	CUSTOMER'S DRWG. NUM.	FILE	SYSTEM: AutoCAD
	LOCATION OF MILL	CUSTOMER'S POS. NUM.		
QUOT. NUM. / PROJECT NUM.: 160096	LANGUAGES: EN / -	SCALE: 1:150	DRAWN: LRK	DATE: 2019-11-19
DOCUMENT KIND: DEPARTMENT LAYOUT			CHECKED: CTU	DATE: 2019-11-19
TITLE: ROOF LEVEL			APPROVED: CTU	DATE: 2019-11-19
-	-		DOCUMENT ID: KSDM160096204	SHEET: 1/1 REVISION: -
REASON FOR ISSUE: PRELIMINARY				

A1+210