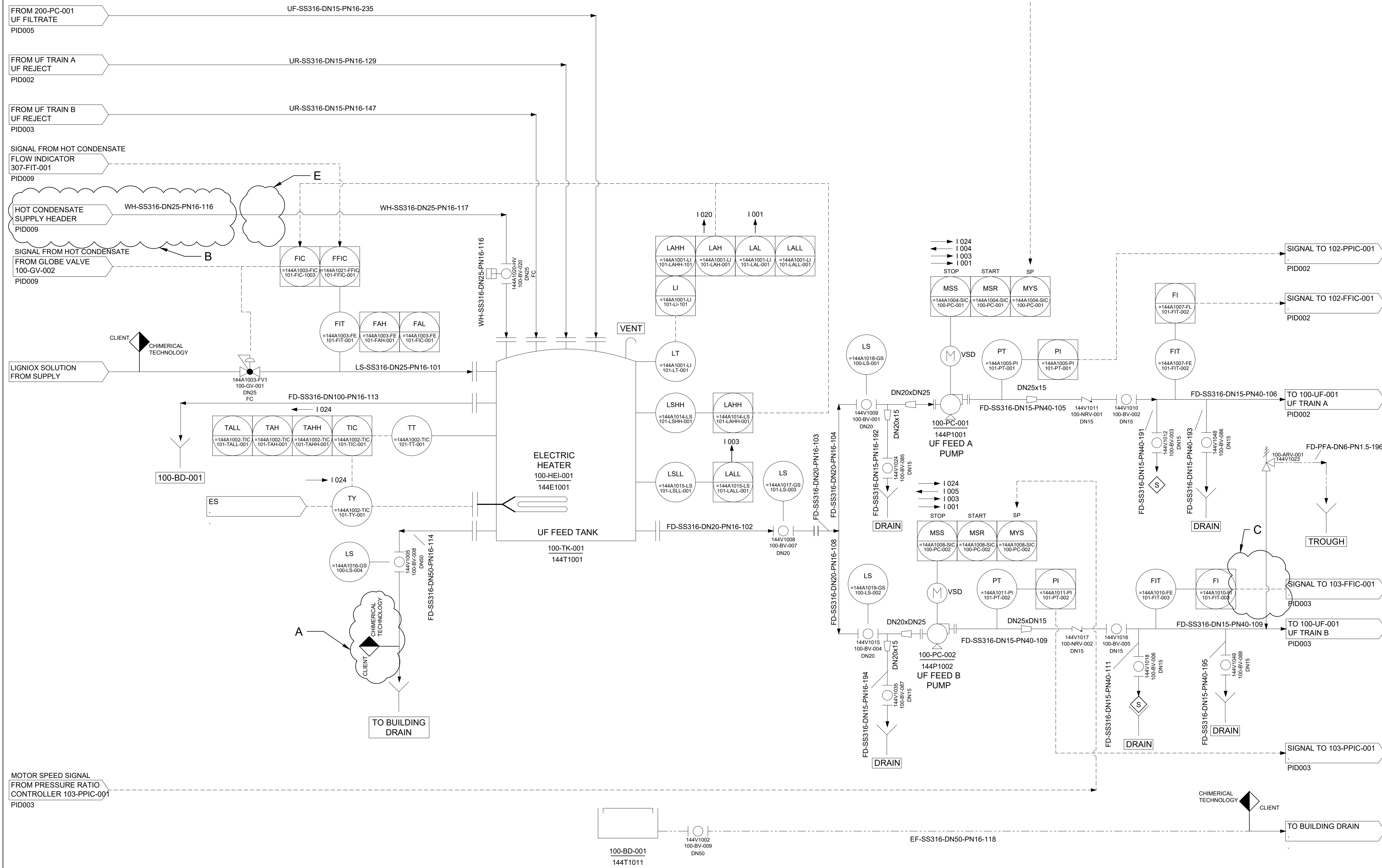


100-TK-001		100-HEI-001		100-PC-001		100-PC-002	
UF FEED TANK A		ELECTRIC FLANGED HEATER		UF FEED PUMP A		UF FEED PUMP B	
CAPACITY	1.96 m³			CAPACITY	0.90 m³/h	CAPACITY	0.54 m³/h
DIMENSIONS	Ø: 1M H: 2M	POWER	9 kW	HEAD	139 m	HEAD	57.1m
MOC	316 SS			POWER	1.1 kW	POWER	0.37 kW
		MOC	INC 800	MOC	316 SS	MOC	316 SS

MOTOR SPEED SIGNAL  
FROM PRESSURE RATIO  
CONTROLLER 102-PPIC-001  
PID002





MOTOR SPEED SIGNAL  
FROM PRESSURE RATIO  
CONTROLLER 103-PPIC-001  
PID003

MATERIAL CODE	
FLUID	CODE
LignoX Solution	LS
UF Feed	FD
UF Filtrate	UF
UF Reject	UR
Combined Concentrate	CC
NF Feed (High Pressure)	FN
NF Concentrate	NC
NF Permeate	NP
CIP Supply	CS
CIP Return	CP
Sulfuric Acid	AS
Caustic Soda (Liquid)	AC
Water Hot (Hot Condensate)	WH
Water Cold (Demineralized)	WC
Water Potable	WP
Effluent	EF
Offgas Vapour	EV
40% SMBS	SM
INSTRUMENT AIR	IA

LEGEND	
Process Stream	—————
Signal	-----
Intermittent	~~~~~
Flexible line	~~~~~
Fail Open	FO
Fail Closed	FC
Sample Valve	◇

- A. ADDED BATTERY LIMIT  
B. OFF PAGE CONNECTOR UNDATED + LINE NUMBER CHANGED  
C. LINE TYPE CHANGED  
D. OFF-PAGE-CONNECTORS ADDED ( SIGNAL TO )  
E. VALVE MOVED TO PID-009

Client



5	AS-BUILT	MM	LK		23/01/2026
4	ISSUED FOR INFORMATION	AH	LK	LC	23/10/2025
3A	ISSUED FOR INFORMATION	RB	-	-	04/04/2025
2	ISSUED FOR CONSTRUCTION	AH	MB	RW	01/02/2025
0	ISSUED FOR INFORMATION	RB	SCV	DS	17/05/2024
REV	DESCRIPTION	DRAWN	CHECKED	APPRVD	DATE

**CM2402**  
ANDRITZ OY  
LIGNIOX MEMBRANE DEMO PLANT  
PIPING & INSTRUMENTATION DIAGRAM  
AREA 100 - FEED - AS-BUILT

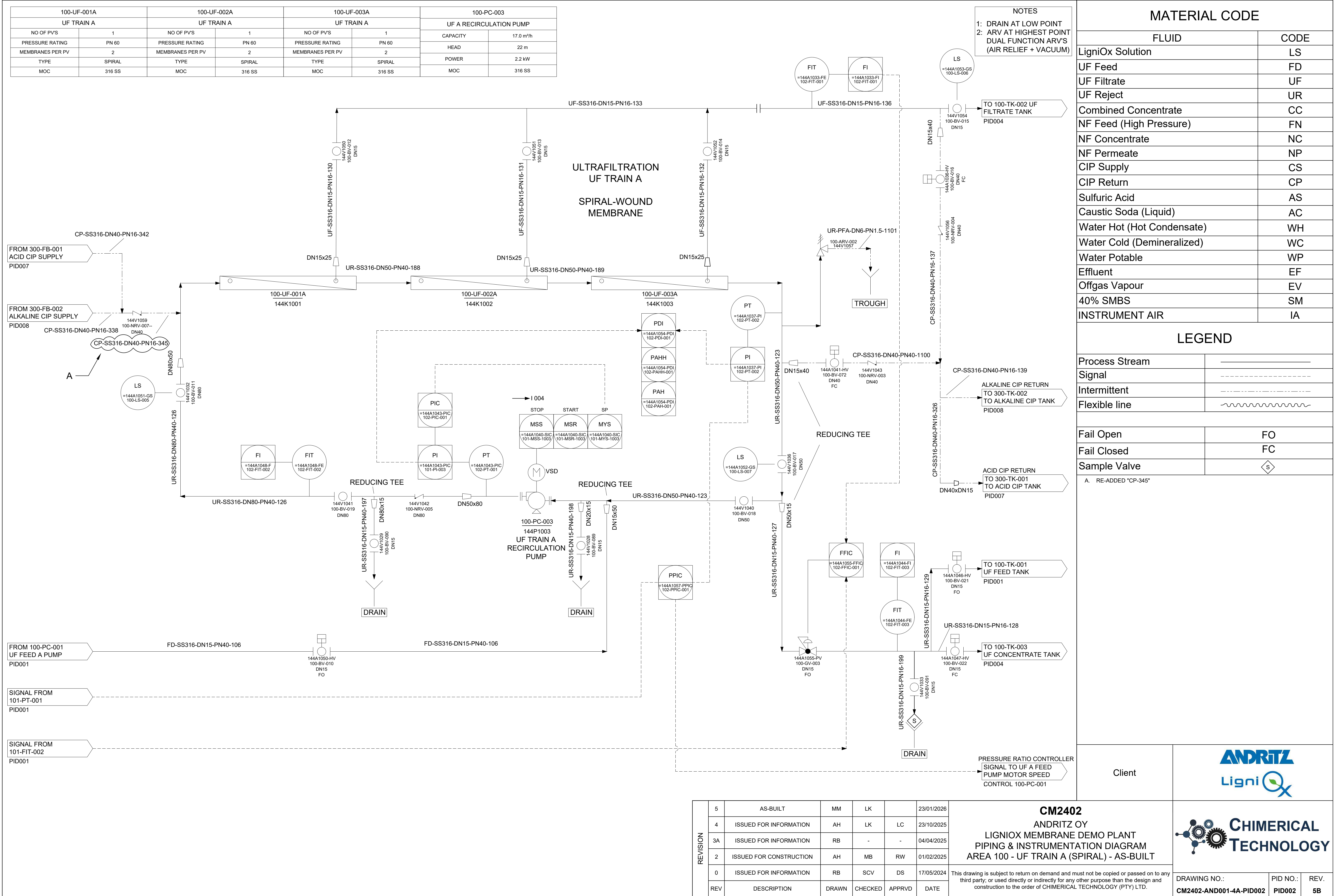
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DRAWING NO.:	PID NO.:	REV.
CM2402-AND001-4A-PID001	PID001	5B

5	AS-BUILT	MM	LK		23/01/2026
4	ISSUED FOR INFORMATION	AH	LK	LC	23/10/2025
3A	ISSUED FOR INFORMATION	RB	-	-	04/04/2025
2	ISSUED FOR CONSTRUCTION	AH	MB	RW	01/02/2025
0	ISSUED FOR INFORMATION	RB	SCV	DS	17/05/2024
REV	DESCRIPTION	DRAWN	CHECKED	APPRVD	DATE






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DRAWING NO.:	PID NO.:	REV.
CM2402-AND001-4A-PID001	PID001	5B





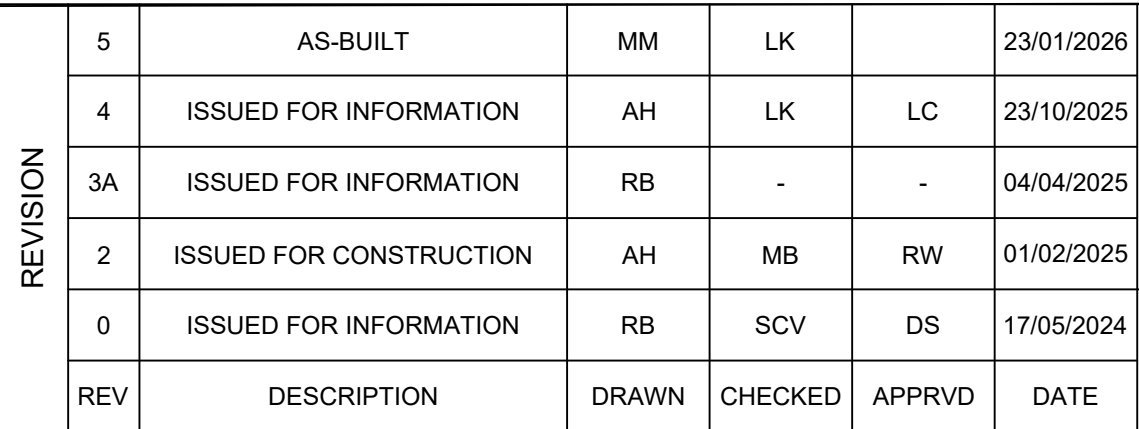


MATERIAL CODE	
FLUID	CODE
LigniOx Solution	LS
UF Feed	FD
UF Filtrate	UF
UF Reject	UR
Combined Concentrate	CC
NF Feed (High Pressure)	FN
NF Concentrate	NC
NF Permeate	NP
CIP Supply	CS
CIP Return	CP
Sulfuric Acid	AS
Caustic Soda (Liquid)	AC
Water Hot (Hot Condensate)	WH
Water Cold (Demineralized)	WC
Water Potable	WP
Effluent	EF
Offgas Vapour	EV
40% SMBS	SM
INSTRUMENT AIR	IA

LEGEND	
Process Stream	
Signal	
Intermittent	
Flexible line	
Fail Open	FO
Fail Closed	FC
Sample Valve	

A. MATERIAL CHANGE SS316 TO PFA



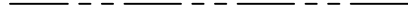


Client			
<p><b>2</b></p> <p>YOY</p> <p>DEMO PLANT</p> <p>ATION DIAGRAM</p> <p>(BULAR) - AS-BUILT</p>	 <p><b>CHIMERICAL TECHNOLOGY</b></p>		
<p>ust not be copied or passed on to any other purpose than the design and TECHNOLOGY (PTY) LTD.</p>	<p>DRAWING NO.:</p> <p><b>CM2402-AND001-4A-PID003</b></p>	<p>PID NO.:</p> <p><b>PID003</b></p>	<p>REV.</p> <p><b>5B</b></p>



**CM2402**  
ANDRITZ OY  
LIGNIOX MEMBRANE DEMO PLANT  
PIPING & INSTRUMENTATION DIAGRAM  
AREA 100 - UF TRAIN B (TUBULAR) - AS-BUILT

This drawing is subject to return on demand and must not be copied or passed on to any third party, or used directly or indirectly for any other purpose than the design and construction to the order of CHEMICAL TECHNOLOGY (PTY) LTD.

This diagram illustrates the process flow for UF/NF concentrate tanks and reject trains. It features three main tanks: UF FILTRATE TANK, UF CONCENTRATE TANK, and COMBINED UF/NF CONCENTRATE TANK. The process involves various feed streams, including hot condensate, permeate, and filtrate, as well as reject trains A and B. Key components include pumps (e.g., 100-BV-001, 100-BV-060), control valves (e.g., 100-TK-002, 100-TK-003), and instrumentation (e.g., LAL, LAH, LAHH, LSHH, LSL, LLL, LSH, LLL). The diagram also shows connections to a building drain and a UF/MIX concentrate stream for processing.

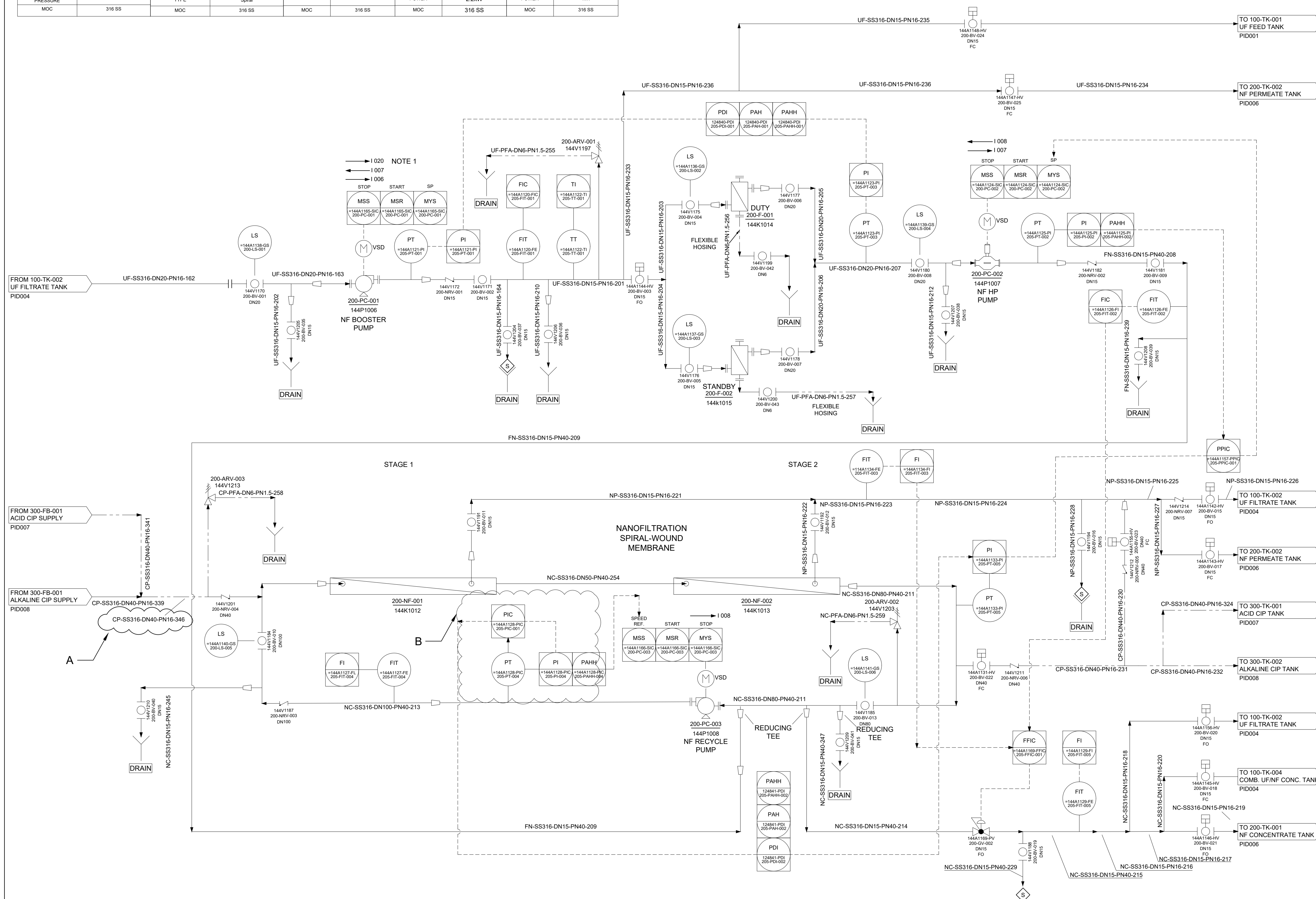
LEGEND	
Process Stream	
Signal	
Intermittent	
Flexible line	
Fail Open	FO
Fail Closed	FC
Sample Valve	

Client	
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**CM2402**  
**ANDRITZ OY**  
**LIGNIOX MEMBRANE DEMO PLANT**  
**PIPING & INSTRUMENTATION DIAGRAM**  
**AREA 100 - UF TANKS - AS-BUILT**




200-F-001 / 2		200-NF-001 / 2		200-PC-001		200-PC-002		200-PC-003	
NF FEED CARTRIDGE FILTERS		NF TRAIN		NF BOOSTER PUMP		NF HP PUMP		NF RECYCLE PUMP	
CAPACITY	1.2 m³/h	NO OF PVS	2	CAPACITY	1.8m³/h	CAPACITY	1.80 m³/h	CAPACITY	43m³/h
MIN PARTICLE SIZE	1 µm	PRESSURE RATING	69 Bar	HEAD	38.6m	HEAD	172m	HEAD	3 Bar
DIFFERENTIAL PRESSURE	2 Bar	MEMBRANES PER PV	1	POWER	0.55 kW	POWER	2.2kW	POWER	4kW
MOC	316 SS	TYPE	Spiral	MOC	316 SS	MOC	316 SS	MOC	316 SS



MATERIAL CODE	
FLUID	CODE
LigniOx Solution	LS
UF Feed	FD
UF Filtrate	UF
UF Reject	UR
Combined Concentrate	CC
NF Feed (High Pressure)	FN
NF Concentrate	NC
NF Permeate	NP
CIP Supply	CS
CIP Return	CP
Sulfuric Acid	AS
Caustic Soda (Liquid)	AC
Water Hot (Hot Condensate)	WH
Water Cold (Demineralized)	WC
Water Potable	WP
Effluent	EF
Offgas Vapour	EV
40% SMBS	SM
INSTRUMENT AIR	IA

LEGEND	
Process Stream	
Signal	
Intermittent	
Flexible line	

Fail Open	FO
Fail Closed	FC
Sample Valve	

A. CHANGED CS TO CP  
B. CHANGED ANDRITZ TAGS FROM 144V TO 144A

NOTES:  
1. ON THE CONDITION VALVE 144A1148-HV IS OPEN

Client



REVISION	5	AS-BUILT	MM	LK		23/01/2026
	4	ISSUED FOR INFORMATION	AH	LK	LC	23/10/2025
	3A	ISSUED FOR INFORMATION	RB	-	-	04/04/2025
	2	ISSUED FOR CONSTRUCTION	AH	MB	RW	01/02/2025
	0	ISSUED FOR INFORMATION	RB	SCV	DS	17/05/2024
	REV	DESCRIPTION	DRAWN	CHECKED	APPRVD	DATE

**CM2402**

ANDRITZ OY

LIGNIOX MEMBRANE DEMO PLANT  
PIPING & INSTRUMENTATION DIAGRAM  
AREA 200 - NF - AS-BUILT

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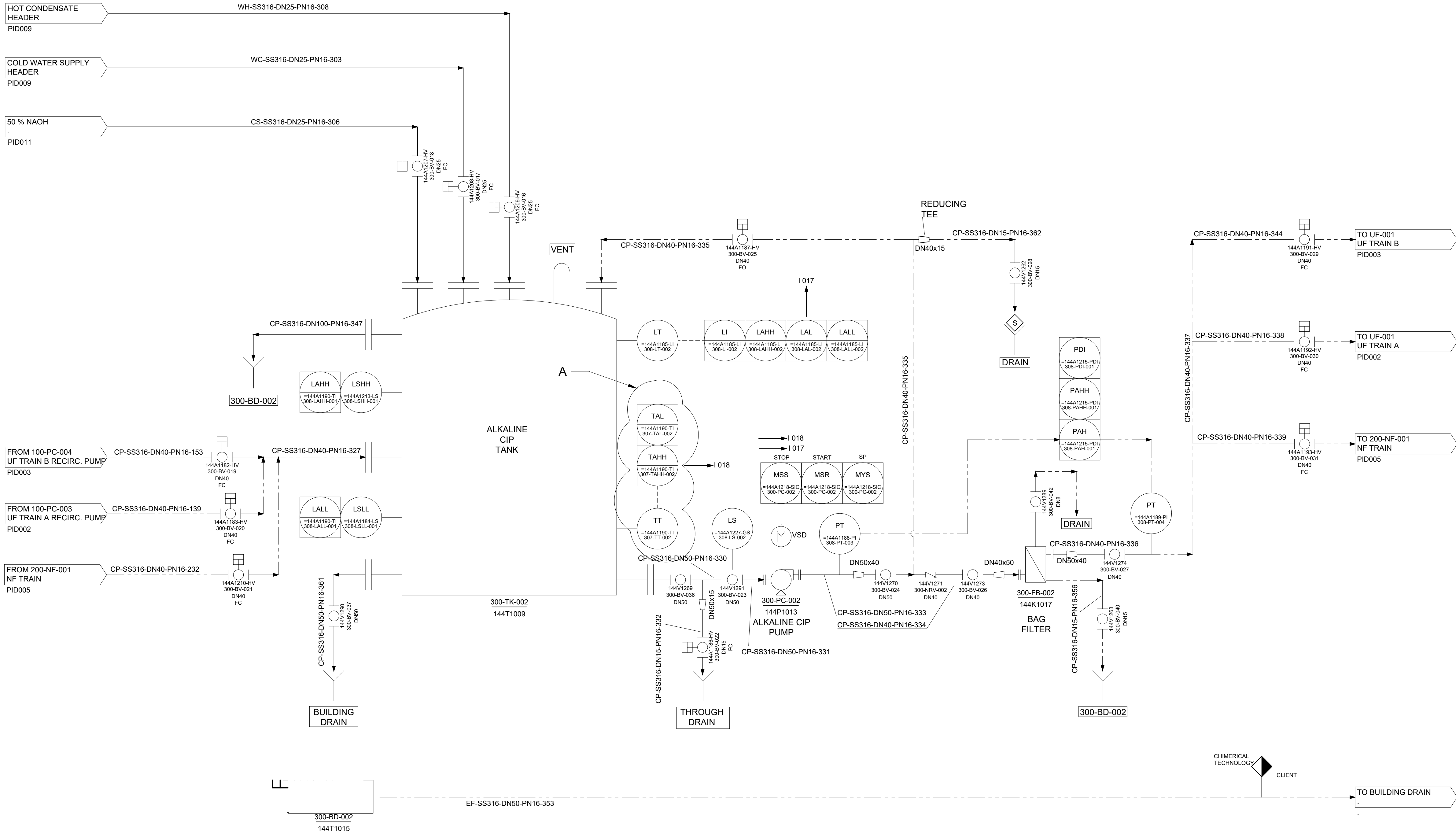
DRAWING NO.:	PID NO.:	REV.
<b>CM2402-AND001-4A-PID005</b>	<b>PID005</b>	<b>5B</b>







300-FB-002		300-PC-001		300-TK-002	
BAG FILTER		ALKALINE CIP PUMP		ALKALINE CIP TANK	
CAPACITY	17 m³/h	CAPACITY	17 m³/h	CAPACITY	1.01 m³
MIN PARTICLE SIZE	1 µm	HEAD	30m	DIMS	Ø 0.89 m H 1.610 m
DIFFERENTIAL PRESSURE	2 bar	POWER	3 kW		
MOC	316 SS	MOC	316 SS	MOC	316 SS



MATERIAL CODE	
FLUID	CODE
LigniOx Solution	LS
UF Feed	FD
UF Filtrate	UF
UF Reject	UR
Combined Concentrate	CC
NF Feed (High Pressure)	FN
NF Concentrate	NC
NF Permeate	NP
CIP Supply	CS
CIP Return	CP
Sulfuric Acid	AS
Caustic Soda (Liquid)	AC
Water Hot (Hot Condensate)	WH
Water Cold (Demineralized)	WC
Water Potable	WP
Effluent	EF
Offgas Vapour	EV
40% SMBS	SM
INSTRUMENT AIR	IA

LEGEND	
Process Stream	_____
Signal	-----
Intermittent	- - - - -
Flexible line	~~~~~
Fail Open	FO
Fail Closed	FC
Sample Valve	◇ S

A - TAG NUMBERS CHANGED

Client

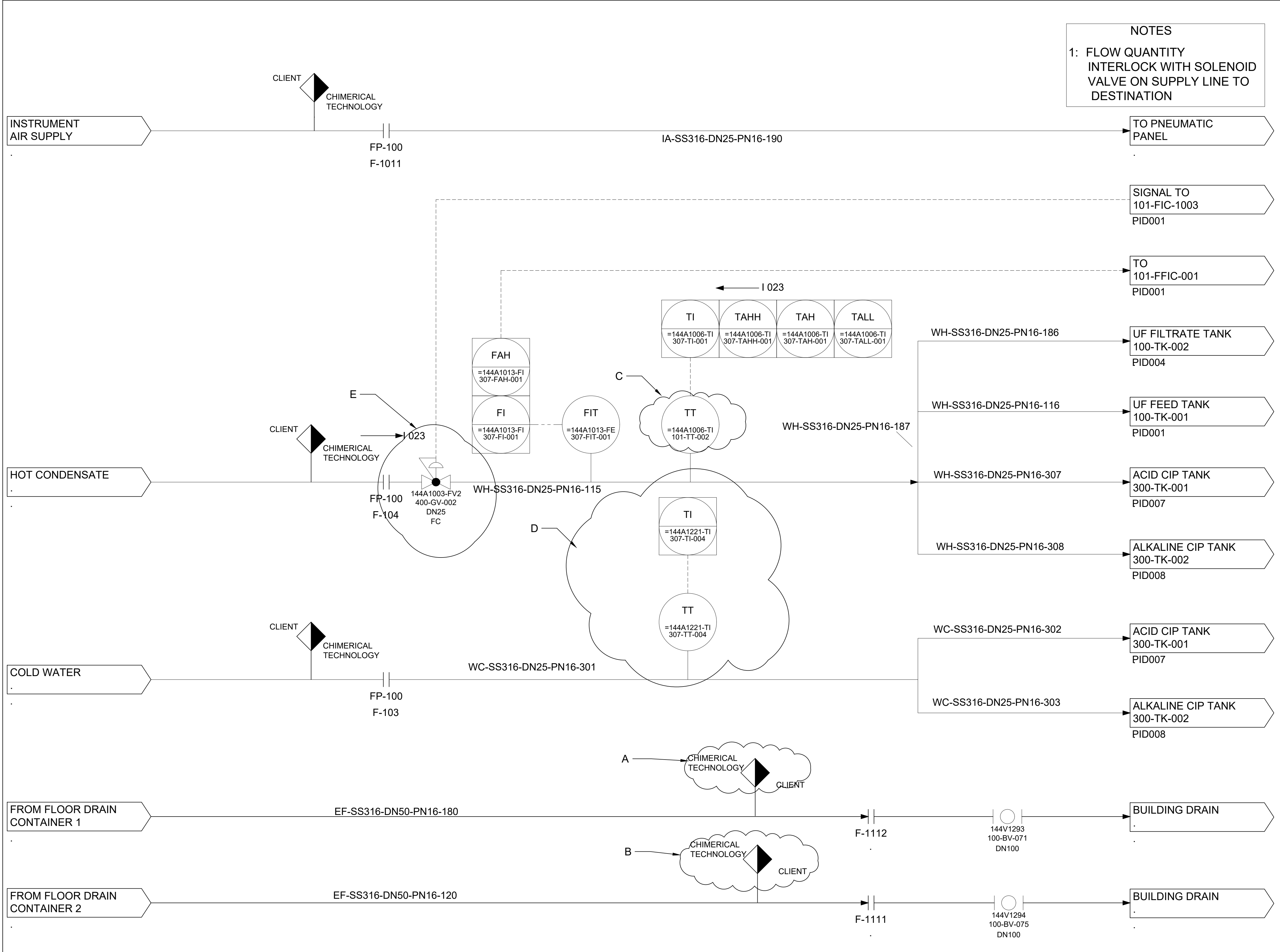
REVISION	5	AS-BUILT	MM	LK		23/01/2026
	4	ISSUED FOR INFORMATION	AH	LK	LC	23/10/2025
	3A	ISSUED FOR INFORMATION	RB	-	-	07/04/2025
	2	ISSUED FOR CONSTRUCTION	AH	MB	RW	01/02/2025
	1Q	ISSUED FOR APPROVAL	AH	MB	RW	29/01/2025
	REV	DESCRIPTION	DRAWN	CHECKED	APPRVD	DATE

**CM2402**  
ANDRITZ OY  
LIGNIOX MEMBRANE DEMO PLANT  
PIPING & INSTRUMENTATION DIAGRAM  
AREA 300 - CIP ALKALINE - AS-BUILT

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DRAWING NO.: **CM2402-AND001-4A-PID008**    PID NO.: **PID008**    REV.: **5B**





MATERIAL CODE	
FLUID	CODE
LigniOx Solution	LS
UF Feed	FD
UF Filtrate	UF
UF Reject	UR
Combined Concentrate	CC
NF Feed (High Pressure)	FN
NF Concentrate	NC
NF Permeate	NP
CIP Supply	CS
CIP Return	CP
Sulfuric Acid	AS
Caustic Soda (Liquid)	AC
Water Hot (Hot Condensate)	WH
Water Cold (Demineralized)	WC
Water Potable	WP
Effluent	EF
Offgas Vapour	EV
40% SMBS	SM
INSTRUMENT AIR	IA

LEGEND	
Process Stream	—————
Signal	-----
Intermittent	- - - - -
Flexible line	~~~~~

Fail Open	FO
Fail Closed	FC
Sample Valve	◇ S

FLANGE PLATES			
F102	DN25	PN10	SS316
F104	DN25	PN10	SS316
F103	DN25	PN10	SS316

A. ADDED BATTERY LIMIT  
B. ADDED BATTERY LIMIT  
C. CHANGED TAG  
D. CHANGED TAG NUMBER  
E. VALVE MOVED FROM PID-001

REVISION	5	AS-BUILT	MM	LK		23/01/2026
	4	ISSUE FOR INFORMATION	AH	LK	LC	23/10/2025
	3A	ISSUE FOR INFORMATION	RB	-	-	07/04/2025
	2	ISSUE FOR CONSTRUCTION	AH	MB	RW	01/02/2025
	1Q	ISSUE FOR APPROVAL	AH	MB	RW	29/01/2025
	REV	DESCRIPTION	DRAWN	CHECKED	APPRVD	DATE

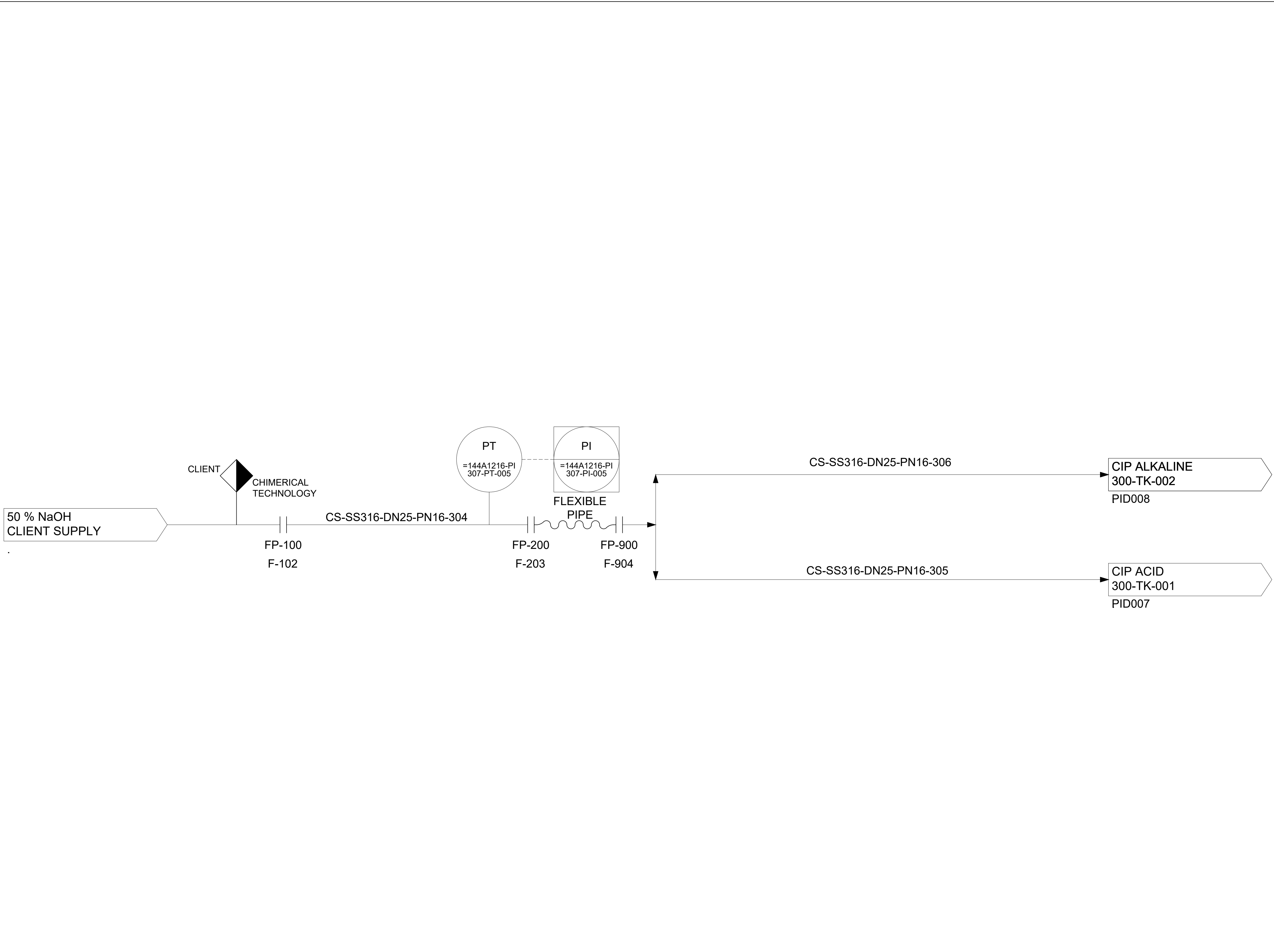
**CM2402**  
ANDRITZ OY  
LIGNIOX MEMBRANE DEMO PLANT  
PIPING & INSTRUMENTATION DIAGRAM  
AREA - UTILITIES - AS-BUILT

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DRAWING NO.: CM2402-AND001-4A-PID009			PID NO.: PID009	REV. 5B
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MATERIAL CODE	
FLUID	CODE
LigniOx Solution	LS
UF Feed	FD
UF Filtrate	UF
UF Reject	UR
Combined Concentrate	CC
NF Feed (High Pressure)	FN
NF Concentrate	NC
NF Permeate	NP
CIP Supply	CS
CIP Return	CP
Sulfuric Acid	AS
Caustic Soda (Liquid)	AC
Water Hot (Hot Condensate)	WH
Water Cold (Demineralized)	WC
Water Potable	WP
Effluent	EF
Offgas Vapour	EV
40% SMBS	SM
INSTRUMENT AIR	IA

LEGEND	
Process Stream	_____
Signal	_____
Intermittent	_____
Flexible line	~~~~~
Fail Open	FO
Fail Closed	FC
Sample Valve	◇S

FLANGE PLATES			
F102	DN25	PN10	SS316

Client

REVISION	5	AS-BUILT	MM	LK		23/01/2026	<b>CM2402</b> ANDRITZ OY LIGNIOX MEMBRANE DEMO PLANT PIPING & INSTRUMENTATION DIAGRAM AREA - REAGENT - AS-BUILT			
	4	ISSUED FOR APPROVAL	AH	LK	LC	23/10/2025				
	3A	ISSUED FOR APPROVAL	RB	-	-	07/04/2025				
	2	ISSUED FOR CONSTRUCTION	AH	MB	RW	01/02/2025				
	1Q	ISSUED FOR APPROVAL	AH	MB	RW	29/01/2025				
	REV	DESCRIPTION	DRAWN	CHECKED	APPRVD	DATE				
This drawing is subject to return on demand and must not be copied or passed on to any third party; or used directly or indirectly for any other purpose than the design and construction to the order of CHIMERICAL TECHNOLOGY (PTY) LTD.							DRAWING NO.:	PID NO.:	REV.	
							<b>CM2402-AND001-4A-PID011</b>	<b>PID011</b>	<b>5B</b>	