


	<b>RMG MADNEULI EXISTING PLANT UPGRADING PROJECT BOLNISI - GEORGIA</b>		 <small>Bureau mines, géologie et métallurgie</small>
Projet N° :	Document N° :	Rev :	Date :
C22006	C22006-05-SPC-001	0	2020/07/14
<b>INSTRUMENTS PACKAGES SPECIFICATION</b>			



## INSTRUMENTS PACKAGES SPECIFICATION

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## 1.0 INTRODUCTION

This specification is related to the Madneuli existing plant upgrading project located in Bolnisi, Georgia. The present technical sheet covers the specifications for instruments packages.

## 2.0 PROJECT GENERAL DATA

- Mining method : Open Pit.
- Process type: Flotation.
- Ore type: Copper and gold ore.
- Location: Bolnisi - Georgia (Country).

## 3.0 SCOPE OF SUPPLY

The offer will cover the provision of complete or partial packages of instruments. The instruments should be selected to be used in one of the following applications:

- Slurry circuits.
- Water circuits.
- Reagent circuits.
- Air circuits.

The tables below summarize the quantities of each type of instruments. Detailed tables are attached in appendix.



## 3.2 Instruments

### 3.2.1 Densimeters

Densimeters should be nuclear type, complete with primary element, radioactive source and signal transmitters for DCS system.

**Table1:** Densimeters

Process medium	Pipe size (mm)	Quantity	Pressure CL
Slurry	450	1	PN10
	200	4	PN10
Concentrate	100	2	PN10
	65	1	PN10
<b>Total</b>		<b>8</b>	

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### 3.2.2 Flowmeters

For all slurry and concentrate lines, flowmeters should be magnetic type. For the rest of lines, general flowmeters could be used. Flowmeters should be equipped with transmitters

**Table 2:** Flowmeters

Process medium	Line size (mm)	Quantity	Pressure CL
Process & Fresh Water	400	1	PN10
	100	15	PN10
	80	1	PN10
	50	4	PN10
	32	1	PN16
Concentrate & Slurry	450	1	PN10
	400	1	PN10
	250	1	PN10
	200	5	PN10
	100	6	PN10
	80	2	PN10
	65	1	PN10
Lime Milk	50	1	PN10
	25	6	PN10
Flotation air	400	1	PN6
Instrument air	100	1	PN16
	<b>Total</b>	<b>48</b>	

### 3.2.3 pH Meters



**Table 3:** pH meters

Process medium	Tank height (mm)	Quantity
Slurry	6000	1
	7000	1
Concentrate	3700	1
	5200	1
	<b>Total</b>	<b>4</b>

### 3.2.4 Flow Switch

**Table 4:** Flow switch

Process medium	Line size (mm)	Quantity	Pressure CL
Process Water	32	3	PN10
	25	34	PN10
	25	4	PN16
	<b>Total</b>	<b>41</b>	

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### 3.2.5 Level Switch

**Table 5:** Level switch

Process medium	Quantity
Concentrate	4
Slurry	3
Flocculant	1
Collector	1
Frother	1
Lime milk	1
<b>Total</b>	<b>11</b>

### 3.2.6 Level Transmitters



Ultrasonic level transmitters are preferred since measuring signal without coming in contact with the medium. Guided wave radar could have the effect of particles build-up on the probe and misidentify the true liquid surface.

**Table 6:** Level transmitters

Process medium	Quantity	Connection to tank
Process Water	2	Support
	1	Flange DN150
Slurry	7	Support
	1	Flange DN80
Concentrate	5	Support
	1	Flange DN100
	2	Flange DN80
Filtrate	1	Support
Tailings	3	Support
Reagents	3	Support
<b>Total</b>	<b>26</b>	

### 3.2.7 Pressure Transmitters

For all slurry and concentrate lines, pressure transmitters should be equipped with flushing connection.

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**Table 7:** Pressure transmitters



Process Medium	Quantity	Line size(mm)	Pressure CL
Process Water	1	400	PN10
	2	80	PN10
	1	50	PN10
	1	40	PN10
	1	32	PN16
Instrument air	1	100	PN16
Flotation air	1	400	PN6
Lime milk	1	50	PN10
Filtrate	1	50	PN10
Drying air	1	-	PN16
<b>Total</b>	<b>11</b>		

### 3.2.8 Pressure Gauge

For all slurry & concentrate lines, pressure gauges should be equipped with flushing connection.

**Table 8:** Pressure gauge

Process Medium	Quantity	Line size (mm)	Pressure CL
Mill slurry	2	450	PN10
Mill slurry	2	250	PN10
Mill slurry	6	200	PN10
Flotation concentrate	2	400	PN10
Flotation concentrate	2	200	PN10
Flotation concentrate	4	150	PN10
Flotation concentrate	12	100	PN10
Flotation concentrate	2	80	PN10
Flotation tailings	2	200	PN10
Flotation tailings	2	100	PN10
Filtrate	2	50	PN10
Lime milk	2	50	PN10
Air drying	1	-	PN16
Process water	2	100	PN10
<b>Total</b>	<b>43</b>		

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### 3.2.9 Thermometers

**Table 9:** Thermometers

Process Medium	Quantity	Line size(mm)	Pressure CL
Flotation air	1	300	PN6
Fresh water	1	50	PN10
<b>Total</b>	<b>2</b>		

## 4.0 TECHNICAL SPECIFICATION

### 4.1 Mechanical Specifications

All pressure instruments shall be capable of continuous operation at the maximum pressure indicated on the chart or scale. All pressure instruments shall have suitable overrange protection.

### 4.2 Electrical & Communication Specifications

- Control Voltage: 24VDC (1 loop, 2 wires). The voltage will be supplied by external source installed in plant automation field cabinet.
- Communication: 4-20mA HART (1 loop, 2 wires).
- Total loops per instrument: 2
- Total wires per instrument: 4

### 4.2 Other Requirements:

Prior to shipping, each instruments should be:



- Calibrated in the factory.
- Tested in the factory.
- Identified by a tags on stainless steel support. In case if the instrument is composed by more than one peace, all pieces should be identified by the same tag.

The tags will be those included in Appendices from 1 to 9.

## 5.0 LOCAL CONDITIONS

The local conditions are:

- Climate: Continental.
- Plant elevation: 718 m above mean sea level.
- Outside temperature: -15 to 35 °C minimum and maximum (annual average).
- Room temperature: 18°C.
- Min. Relative humidity: 45%.
- Max. Relative humidity: 100%.
- Rainfall: 400 mm (annual average).

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- Maximum snow accumulation: 300 mm.
- Snow load: 100 kg/m<sup>2</sup>.
- Seismic activity:

Annual Exceedance Probability (AEP)	Macro-seismic Intensity Scale (MSK-64)	PGA (g)
1:1000y, 5% in 50y	8	0.2-0.3
1:2500y, 2% in 50y	9	0.2-0.3
1:5000y, 1% in 50y	9	0.3-0.4

## 6.0 SHIPPING

For foreign suppliers (out-off Georgia), the equipment must be packed in suitable packaging for transportation to Poti port (Georgia) and then by trucks or train to plant.

For local suppliers, items must be packed for transportation by trucks or train to the plant at Madneuilli.

## 7.0 TECHNICAL PROPOSAL

The technical proposal must include the following documentation:



- Products description.
- Technical specification for selected items:
  - measurement rang
  - typical installation drawings
  - tagging method and material
  - calibration process
- List of equipment.
- List of Certifications.

## 8.0 COMMERCIAL PROPOSAL

The proposal must include but not limited to:

- Products description.
- Price Breakdown including:
  - Each instrument price.
  - Calibration cost.
  - Spare parts price for commissioning and 2 years maintenance price.
  - Shipment Cost, CIF Port of Poti, Georgia.
  - Field assistance during commissioning and start-up.



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- Modalities and general sales conditions.
- Packaging.
- List and cost for the documents to be delivered.
- Payment terms.
- Warranties and Performance Guaranties.
- Delivery Time and schedule.
- Validity of the proposal (Days).

#### **9.0 DOCUMENTS TO BE DELIVERED BY SUCCESSFUL BIDDER**

The successful bidder should deliver the following documents:

- Installation, Operation and Maintenance manuals (IOM).
- Installation generic drawings.
- Maintenance manuals.
- Spare parts list.
- Tests & calibration certificates.

#### **10.0 APPENDIX**

- List of Instruments # C22005-05-LIS-001:
  - Appendix 1 - Densimeters.
  - Appendix 2 - Flowmeters.
  - Appendix 3 – pH Meters.
  - Appendix 4 - Flow Switch.
  - Appendix 5 - Level Switch.
  - Appendix 6 - Level Transmitters.
  - Appendix 7 - Pressure Transmitters
  - Appendix 8 - Pressure Gauge.
  - Appendix 9 - Thermometers.

APPENDIX 1 : DENSIMETERS

Appendix 1: Densimeters										
Equipment/Pipe Ref	Tag	Loop Description	Function Description	PI-Diagrams	Process Medium	Pipe /Size	Connection	Pressure CL	Flowrate (m3/h)	Density (t/m3)
ZG03-CY001	ZG03-CY001-D01-DE	TERTIARY HC CLUSTER FEED DENSITY CONTROL	Densimeter	900853_MCP01_ZG03_PFB06_00001	MILL SLURRY	450	Pipe Clamp	PN10	1558	1,47
ST01-TH001	ST01-TH001-D02-DE	THICKENER UNDERFLOW DENSITY	Densimeter	900853_MCP01_ST01_PFB06_50002	Flotation concentrate	65	Pipe Clamp	PN10	12	1,72
ST01-TK001	ST01-TK001-D01-DE	CONCENTRATE TO THICKENER DENSITY	Densimeter	900853_MCP01_ST01_PFB06_50001	Flotation concentrate	100	Pipe Clamp	PN10	59	1,15
ZG03-GM101	ZG03-GM101-D01-DE	REGRINDING MILL INLET DENSITY CONTROL	Densimeter	900853_MCP01_ZG03_PFB06_20004	Flotation concentrate	100	Pipe Clamp	PN10	76	1,5
ZG02-CY003	ZG02-CY003-D01-DE	GRINDING CIRCUIT #3 SUMP DENSITY CONTROL	Densimeter	900853_MCP01_ZG02_PFB06_00013	MILL SLURRY	200	Pipe Clamp	PN10	325	1,48
ZG02-CY002	ZG02-CY002-D01-DE	GRINDING CIRCUIT #2 SUMP DENSITY CONTROL	Densimeter	900853_MCP01_ZG02_PFB06_00010	MILL SLURRY	200	Pipe Clamp	PN10	370	1,48
ZG02-CY001	ZG02-CY001-D01-DE	GRINDING CIRCUIT #1 SUMP DENSITY CONTROL	Densimeter	900853_MCP01_ZG02_PFB06_00008	MILL SLURRY	200	Pipe Clamp	PN10	370	1,48
ZG03-CY101	ZG03-CY101-D01-DE	REGRINDING HC CLUSTER FEED DENSITY CONTROL	Densimeter	900853_MCP01_ZG03_PFB06_20001	MILL SLURRY	200	Pipe Clamp	PN10	235	1,23

APPENDIX 2 : FLOWMETERS

Appendix 2: Flowmeters										
Equipment Ref	Tag	Loop Description	Function Description	PI-Diagrams	Process Medium	Pipe /Size	Pressure CL	Flowrate (m3/h)	Density (t/m3)	
ZF01-AFL-10121	ZF01-AFL-10121-F01-FE	FLOTATION AIR MAIN LINE FLOW	General Flowmeter	900853_MCP01_ZF01_PFB06_10006	Flotation air	400	PN6	8500	-	
AG20-80001-AIN	AG20-80001-AIN-F01-FE	INSTRUMENT AIR MAIN LINE FLOW	General Flowmeter	900853_MCP01_AG20_PFB06_80001	Instrument air	100	PN16	900	-	
ST01-TK001	ST01-TK001-F01-FE	THICKENER FEED FLOW	Magnetic Flowmeter	900853_MCP01_ST01_PFB06_50001	Flotation concentrate	100	PN10	59	1,15	
SF01-TK001	SF01-PU001-M01-FE	FILTER FEED LINE FLOW	Magnetic Flowmeter	900853_MCP01_SF01_PFB06_60001	Flotation concentrate	100	PN10	97,3	1,72	
ST01-TH001	ST01-TH001-F01-FE	THICKENER UNDERFLOW	Magnetic Flowmeter	900853_MCP01_ST01_PFB06_50002	Flotation concentrate	65	PN10	12	1,72	
ZF03-BA003	ZF03-BA003-F01-FE	FINAL CONCENTRATE FLOW TO THICKENER	Magnetic Flowmeter	900853_MCP01_ZF03_PFB06_40005	Flotation concentrate	80	PN10	50,6	1,17	
ZF03-BA001	ZF03-BA001-F01-FE	2ND CLEANER CONCENTRATE SUMP OUTFLOW	Magnetic Flowmeter	900853_MCP01_ZF03_PFB06_40003	Flotation concentrate	100	PN10	57	1,17	
ZF02-BA001	ZF02-BA001-F01-FE	1ST CLEANER FLOTATION TAILINGS OUTFLOW	Magnetic Flowmeter	900853_MCP01_ZF02_PFB06_30003	Flotation concentrate	100	PN10	82	1,21	
ZF01-BA002	ZF01-BA002-F01-FE	SCAVENGER CONCENTRATE FLOW TO ROUGHER CONDITIONER	Magnetic Flowmeter	900853_MCP01_ZF01_PFB06_10007	Flotation concentrate	80	PN10	25	1,15	
ZG03-GM101	ZG03-GM101-F01-FE	REGRINDING MILL INLET FLOW CONTROL	Magnetic Flowmeter	900853_MCP01_ZG03_PFB06_20004	Flotation concentrate	100	PN10	76	1,5	
ZG03-CY101	ZG03-CY101-F01-FE	REGRINDING HC CLUSTER FEED FLOW	Magnetic Flowmeter	900853_MCP01_ZG03_PFB06_20001	Flotation concentrate	200	PN10	235	1,23	
ZF03-BA002	ZF03-BA002-F01-FE	2ND CLEANER TAILINGS OUTFLOW	Magnetic Flowmeter	900853_MCP01_ZF03_PFB06_40004	Flotation Tailings	100	PN10	57	1,14	
ZF02-BA002	ZF02-BA002-F01-FE	1ST CLEANER FLOTATION TAILINGS OUTFLOW	Magnetic Flowmeter	900853_MCP01_ZF02_PFB06_30004	Flotation Tailings	200	PN10	276	1,16	
ZF01-BA003	ZF01-BA003-F01-FE	FINAL TAILINGS SUMP WATER ADDITION CONTROL	Magnetic Flowmeter	900853_MCP01_ZF01_PFB06_10005	Flotation Tailings	400	PN10	1108	1,21	
AA01-TK001	AA01-TK001-F01-FE	LIME MILK DOSING TO LIME DISTRIBUTION TANK	Magnetic Flowmeter	900853_MCP01_AA01_PFB06_70005	LIME MILK	50	PN10	11,8	1,17	
AA01-TK001	AA01-TK001-F02-FE	LIME MILK DOSING TO ROUGHER FLOT. CONDITIONNER	Magnetic Flowmeter	900853_MCP01_AA01_PFB06_70005	LIME MILK	25	PN10	2	1,17	
AA01-TK001	AA01-TK001-F03-FE	LIME MILK DOSING TO TERTIARY GRINDING SUMP	Magnetic Flowmeter	900853_MCP01_AA01_PFB06_70005	LIME MILK	25	PN10	2	1,17	
AA01-TK001	AA01-TK001-F04-FE	LIME MILK DOSING TO 1ST CLEANER CONDITIONNER	Magnetic Flowmeter	900853_MCP01_AA01_PFB06_70005	LIME MILK	25	PN10	2	1,17	
AA01-TK001	AA01-TK001-F05-FE	LIME MILK DOSING TO HIG MILL FEED SUMP	Magnetic Flowmeter	900853_MCP01_AA01_PFB06_70005	LIME MILK	25	PN10	2	1,17	
AA01-TK001	AA01-TK001-F06-FE	LIME MILK DOSING TO 2ND CLEANER	Magnetic Flowmeter	900853_MCP01_AA01_PFB06_70005	LIME MILK	25	PN10	2	1,17	
AA01-TK001	AA01-TK001-F07-FE	LIME MILK DOSING TO 3RD CLEANER	Magnetic Flowmeter	900853_MCP01_AA01_PFB06_70005	LIME MILK	25	PN10	2	1,17	
ZG03-CY001	ZG03-CY001-F01-FE	SLURRY FLOW CONTROL TO TERTIARY HC CLUSTER	Magnetic Flowmeter	900853_MCP01_ZG03_PFB06_00001	MILL SLURRY	450	PN10	1558	1,47	
ZG02-CY003	ZG02-CY003-F02-FE	GRINDING MILL #1 CYCLONE FEED FLOW	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_00013	MILL SLURRY	200	PN10	325	1,48	
ZG02-BA004	ZG02-BA004-F01-FE	MILL #6 AND #7 HC OVERFLOW SUMP OUTFLOW	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_00011	HC SLURRY	250	PN10	660	1,27	
ZG02-CY002	ZG02-CY001-F02-FT	GRINDING MILL #6 CYCLONE FEED FLOW	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_00010	MILL SLURRY	200	PN10	370	1,48	
ZG02-CY002	ZG02-CY001-F02-FE	GRINDING MILL #7 CYCLONE FEED FLOW	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_00008	MILL SLURRY	200	PN10	370	1,48	
AG30-TK001	AG30-TK001-F01-FE	PROCESS WATER MAIN LINE FLOW	Magnetic Flowmeter	900853_MCP01_AG30_PFB06_80003	PROCESS WATER	400	PN10	941	1	
ST01-TK002	ST01-TK002-F01-FE	PROCESS WATER	Magnetic Flowmeter	900853_MCP01_ST01_PFB06_50003	PROCESS WATER	100	PN10	54	1	
ZG02-BA004	ZG02-BA004-F02-FE	MILLS #6 AND #7 HC OF SUMP WATER ADDITION CONTROL	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_00011	PROCESS WATER	100	PN10	60	1	
ZF03-FT005	ZF03-FT005-F02-FE	3RD CLEANER FLOTATION PROCESS WATER FLOW	Magnetic Flowmeter	900853_MCP01_ZF03_PFB06_40002	PROCESS WATER	50	PN10	16,4	1	
ZF03-FT001	ZF03-FT001-F02-FE	2ND CLEANER FLOTATION PROCESS WATER FLOW	Magnetic Flowmeter	900853_MCP01_ZF03_PFB06_40001	PROCESS WATER	50	PN10	16,4	1	
ZF02-FT001	ZF02-FT001-F02-FE	1ST CLEANER FLOTATION PROCESS WATER FLOW	Magnetic Flowmeter	900853_MCP01_ZF02_PFB06_30002	PROCESS WATER	50	PN10	16,4	1	
ZF01-BA001	ZF01-BA001-F02-FE	ROUGHER CONCENTRATE FLOW TO REGRIND HC	Magnetic Flowmeter	900853_MCP01_ZF01_PFB06_10004	PROCESS WATER	50	PN10	16,4	1	
ZF01-FT005	ZF01-FT005-F02-FE	ROUGHER/SCAVENGER CONCENTRATE DUCT FLUSHING WATER	Magnetic Flowmeter	900853_MCP01_ZF01_PFB06_10003	PROCESS WATER	100	PN10	60	1	
ZF01-FT001	ZF01-FT001-F02-FE	ROUGHER PROCESS WATER FLOW	Magnetic Flowmeter	900853_MCP01_ZF01_PFB06_10002	PROCESS WATER	100	PN10	60	1	
ZG03-BA102	ZG03-BA102-F01-FE	REGRIND FEED SUMP WATER FLOW CONTROL	Magnetic Flowmeter	900853_MCP01_ZG03_PFB06_20003	PROCESS WATER	100	PN10	60	1	
ZG03-BA001	ZG03-BA001-F01-FE	TERTIARY GRINDING SUMP WATER FLOW CONTROL	Magnetic Flowmeter	900853_MCP01_ZG03_PFB06_00002	PROCESS WATER	100	PN10	60	1	
ZG01-GM008	ZG01-GM006-F08-FE	PROCESS WATER FLOW CONTROL TO GRINDING MILL #8	Magnetic Flowmeter	900853_MCP01_ZG01_PFB06_00014	PROCESS WATER	100	PN10	80	1	
ZG01-GM002	ZG01-GM005-F02-FE	PROCESS WATER FLOW CONTROL TO GRINDING MILL #2	Magnetic Flowmeter	900853_MCP01_ZG01_PFB06_00014	PROCESS WATER	100	PN10	80	1	
ZG01-GM003	ZG01-GM004-F03-FE	PROCESS WATER FLOW CONTROL TO GRINDING MILL #3	Magnetic Flowmeter	900853_MCP01_ZG01_PFB06_00014	PROCESS WATER	100	PN10	80	1	
ZG01-GM004	ZG01-GM003-F04-FE	PROCESS WATER FLOW CONTROL TO GRINDING MILL #4	Magnetic Flowmeter	900853_MCP01_ZG01_PFB06_00014	PROCESS WATER	100	PN10	80	1	
ZG01-GM005	ZG01-GM002-F05-FE	PROCESS WATER FLOW CONTROL TO GRINDING MILL #5	Magnetic Flowmeter	900853_MCP01_ZG01_PFB06_00014	PROCESS WATER	100	PN10	80	1	
ZG01-GM009	ZG01-GM001-F09-FE	PROCESS WATER FLOW CONTROL TO GRINDING MILL #9	Magnetic Flowmeter	900853_MCP01_ZG01_PFB06_00014	PROCESS WATER	100	PN10	80	1	
ZG02-BA003	ZG02-CY001-F01-FE	WATER FLOW FOR HC FEED SUMP IN CIRCUIT #3	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_00012	PROCESS WATER	100	PN10	60	1	
ZG02-BA002	ZG02-CY001-F01-FE	WATER FLOW FOR HC FEED SUMP IN CIRCUIT #2	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_00009	PROCESS WATER	100	PN10	60	1	
ZG02-BA001	ZG02-CY001-F01-FE	WATER FLOW FOR HC FEED SUMP IN CIRCUIT #1	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_00007	PROCESS WATER	100	PN10	60	1	
AG35-91001-WFR	AG35-91001-WFR-F01-FE	GLAND SEAL WATER MAIN LINE FLOW	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_90002	FRESH WATER	80	PN10	40	1	
AG35-91041-WFR	AG35-91041-WFR-F01-FE	GLAND SEAL WATER MAIN LINE FLOW	Magnetic Flowmeter	900853_MCP01_ZG02_PFB06_90004	FRESH WATER	32	PN16	6	1	

**APPENDIX 3 : Ph meters**

<b>Appendix 3 - pH meters</b>						
<b>Equipment/Pipe Ref</b>	<b>Tag</b>	<b>Loop Description</b>	<b>Function Description</b>	<b>PI-Diagrams</b>	<b>Process Medium</b>	<b>Tank hight (mm)</b>
ZF03-FT004	ZF03-FT004-A01-AE	3RD CLEANER TANKCELL 1 PH VALUE	pH Meter	900853_MCP01_ZF03_PFB06_40002	Concentrate	3700
ZF03-FT001	ZF03-FT001-A01-AE	2ND CLEANER TANKCELL 1 PH VALUE	pH Meter	900853_MCP01_ZF03_PFB06_40001	Concentrate	5200
ZF02-FT001	ZF02-FT001-A01-AE	1ST CLEANER TANKCELL 1 PH VALUE	pH Meter	900853_MCP01_ZF02_PFB06_30002	Mill slurry	6000
ZF01-FT001	ZF01-FT001-A01-AE	ROUGHER TANKCELL 1 PH VALUE	pH Meter	900853_MCP01_ZF01_PFB06_10002	Mill slurry	7000

**APPENDIX 4 : FLOW SWITCH**

<b>Appendix 4: Flow switch</b>							
<b>Equipment Ref</b>	<b>Tag</b>	<b>Loop Description</b>	<b>Function</b>	<b>PI-Diagrams</b>	<b>Process Medium</b>	<b>Pipe Size</b>	<b>Pressure CL</b>
ZG02-PU008	ZG02-PU008-F10-FS	MILLS #6 AND #7 SUMP PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
ZG02-PU007	ZG02-PU007-F10-FS	MILLS #6 AND #7 SUMP PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
AA01-PU002	AA01-PU002-F10-FS	LIME MILK DISTRIBUTION PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
AA01-PU001	AA01-PU001-F10-FS	LIME MILK DISTRIBUTION PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
AE02-SE103	AE02-SE103-F01-FS	SAFETY SHOWER WATER FLOW	Flow Switch	900853_MCP01_AE02_PFB06_90001	Process Water	32mm	PN10
ZF03-PU014	ZF03-PU006-F10-FS	COURRIER SAMPLER IN 3RD CLEANER TAILINGS PUMP	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF03-PU006	ZF03-PU006-F10-FS	FINAL TAILINGS PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF03-PU005	ZF03-PU005-F10-FS	FINAL TAILINGS PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF03-PU004	ZF03-PU004-F10-FS	2ND CLEANER TAILINGS PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF03-PU003	ZF03-PU003-F10-FS	2ND CLEANER TAILINGS PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF03-PU002	ZF03-PU002-F10-FS	2ND CLEANER CONCENTRATE PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF03-PU001	ZF03-PU001-F10-FS	2ND CLEANER CONCENTRATE PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
AE02-SE102	AE02-SE102-F01-FS	SAFETY SHOWER WATER FLOW	Flow Switch	900853_MCP01_AE02_PFB06_90001	Process Water	32mm	PN10
ZF02-PU004	ZF02-PU004-F10-FS	1ST CLEANER TAILINGS PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF02-PU003	ZF02-PU003-F10-FS	1ST CLEANER TAILINGS PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF02-PU002	ZF02-PU002-F10-FS	1ST CLEANER CONCENTRATE PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF02-PU001	ZF02-PU001-F10-FS	1ST CLEANER CONCENTRATE PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
AE02-SE101	AE02-SE101-F01-FS	SAFETY SHOWER WATER FLOW	Flow Switch	900853_MCP01_AE02_PFB06_90001	Process Water	32mm	PN10
ZF01-PU102	ZF01-PU002-F10-FS	ROUGHER FLOTATION TAILINGS SAMPLER PUMP	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF01-PU006	ZF01-PU006-F10-FS	FINAL TAILINGS PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF01-PU005	ZF01-PU005-F10-FS	FINAL TAILINGS PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF01-PU004	ZF01-PU004-F10-FS	SCAVENGER HC FEED PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF01-PU003	ZF01-PU003-F10-FS	SCAVENGER HC FEED PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF01-PU002	ZF01-PU001-F10-FS	ROUGHER HC FEED PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZF01-PU001	ZF01-PU002-F10-FS	ROUGHER HC FEED PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZG03-PU109	ZG03-PU109-F10-FS	REGRINDING FEED PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZG03-PU108	ZG03-PU108-F10-FS	REGRINDING FEED PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZG03-PU102	ZG03-PU102-F10-FS	REGRINDING DISCHARGE PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZG03-PU101	ZG03-PU101-F10-FS	REGRINDING DISCHARGE PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90003	Process Water	25mm	PN10
ZG03-PU002	ZG03-PU002-F10-FS	TERTIARY GRINDING FEED PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
ZG03-PU001	ZG03-PU001-F10-FS	TERTIARY GRINDING FEED PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
ZG02-PU006	ZG02-PU006-F10-FS	GRINDING CIRCUIT #3 SUMP PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
ZG02-PU005	ZG02-PU005-F10-FS	GRINDING CIRCUIT #3 SUMP PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
ZG02-PU004	ZG02-PU004-F10-FS	GRINDING CIRCUIT #2 SUMP PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
ZG02-PU003	ZG02-PU003-F10-FS	GRINDING CIRCUIT #2 SUMP PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
ZG02-PU002	ZG02-PU002-F10-FS	GRINDING CIRCUIT #1 SUMP PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
ZG02-PU001	ZG02-PU001-F10-FS	GRINDING CIRCUIT #1 SUMP PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90002	Process Water	25mm	PN10
ST01-PU001	ST01-PU001-F10-FS	THICKENER FEED PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90004	Process Water	25mm	PN16
ST01-PU002	ST01-PU001-F10-FS	THICKENER FEED PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90004	Process Water	25mm	PN16
SF01-PU001	SF01-PU001-F10-FS	FILTER FEED PUMP 1 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90004	Process Water	25mm	PN16
SF01-PU002	SF01-PU002-F10-FS	FILTER FEED PUMP 2 SEALING WATER FLOW	Flow Switch	900853_MCP01_AG35_PFB06_90004	Process Water	25mm	PN16

**APPENDIX 5 : LEVEL SWITCH**

<b>Appendix 5: Level switch</b>					
<b>Equipment Ref</b>	<b>Tag</b>	<b>Loop Description</b>	<b>Function Description</b>	<b>PI-Diagrams</b>	<b>Process Medium</b>
AA03-BA001	AA03-BA001-L01-LS	FLOCCULANT DOSING AREA FLOOR PIT LEVEL	Level Switch	900853_MCP01_AA03_PFB06_70004	Flocculant
AA02-BA002	AA02-BA002-L01-LS	COLLECTOR DOSING AREA FLOOR PIT LEVEL	Level Switch	900853_MCP01_AA02_PFB06_70003	Collector
AA02-BA001	AA02-BA001-L01-LS	FROTHER DOSING AREA FLOOR PIT LEVEL	Level Switch	900853_MCP01_AA02_PFB06_70001	Frother
AA01-BA001	AA01-BA001-L01-LS	LIME DISTRIBUTION AREA FLOOR PIT LEVEL	Level Switch	900853_MCP01_AA01_PFB06_70005	Lime milk
SF01-BA001	SF01-BA001-L01-LS	FILTRATION FLOOR PIT LEVEL	Level Switch	900853_MCP01_SF01_PFB06_60002	Concentrate
ST01-BA001	ST01-BA001-L01-LS	THICKENING FLOOR PIT LEVEL	Level Switch	900853_MCP01_ST01_PFB06_50001	Concentrate
ZF03-BA004	ZF03-BA004-L01-LS	2ND CLEANER FLOTATION FLOOR PIT LEVEL	Level Switch	900853_MCP01_ZF03_PFB06_40001	Concentrate
ZF02-BA003	ZF02-BA003-L01-LS	1ST CLEANER FLOTATION AREA FLOOR PIT LEVEL	Level Switch	900853_MCP01_ZF02_PFB06_30001	Concentrate
ZF01-BA004	ZF01-BA004-L01(1)-LS	ROUGHER FLOTATION FLOOR PIT LEVEL	Level Switch	900853_MCP01_ZF01_PFB06_10001	Slurry
ZG03-BA103	ZG03-BA103-L01-LS	REGRINDING FLOOR PIT LEVEL	Level Switch	900853_MCP01_ZG03_PFB06_20002	Slurry
ZG03-BA002	ZG03-BA002-L01-LS	TERTIARY GRINDING FLOOR PIT LEVEL	Level Switch	900853_MCP01_ZG03_PFB06_00002	Slurry

**APPENDIX 6 : LEVEL TRANSMITTERS**

<b>Appendix 6 - Level transmitters</b>							
<b>Equipment/Pipe Ref</b>	<b>Loop Tag</b>	<b>Tag</b>	<b>Loop Description</b>	<b>Function Description</b>	<b>PI-Diagrams</b>	<b>Medium</b>	<b>Connection</b>
AG30-TK001	AG30-TK001-L01	AG30-TK001-L01-LT	PROCESS WATER TANK LEVEL	Ultrasonic Level Transmitter	900853_MCP01_AG30_PFB06_80002	Proces water	Supported
ZG02-BA004	ZG02-BA004-L01	ZG02-BA004-L01-LT	MILL #6 AND #7 HC OVERFLOW SUMP LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ZG02_PFB06_00011	Slurry	Supported
AA01-TK001	AA01-TK001-L01	AA01-TK001-L01-LT	LIME MILK DISTRIBUTION TANK LEVEL	Ultrasonic Level Transmitter	900853_MCP01_AA01_PFB06_70005	Lime milk	Supported
AA02-TK002	AA02-TK002-L01	AA02-TK002-L01-LT	COLLECTOR DISTRIBUTION TANK LEVEL	Ultrasonic Level Transmitter	900853_MCP01_AA02_PFB06_70003	Collector	Flanged DN50
AA02-TK001	AA02-TK001-L01	AA02-TK001-L01-LT	FROTHER DISTRIBUTION TANK LEVEL	Ultrasonic Level Transmitter	900853_MCP01_AA02_PFB06_70001	Frother	Flanged DN50
ST01-TK001	ST01-TK001-L01	ST01-TK001-L01-LT	THICKENER FEED TANK LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ST01_PFB06_50001	Concentrate	Flanged DN80
SF01-TK002	SF01-TK002-L01	SF01-TK002-L01-LT	FILTRATE TANK LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_SF01_PFB06_60004	Filtrate	Flanged DN100
SF01-TK003	SF01-TK003-L01	SF01-TK003-L01-LT	CLOTH WASH TANK LEVEL	Ultrasonic Level Transmitter	900853_MCP01_SF01_PFB06_60006	Proces water	Supported
SF01-TK001	SF01-TK001-L01	SF01-TK001-L01-LT	FILTER FEED TANK LEVEL	Ultrasonic Level Transmitter	900853_MCP01_SF01_PFB06_60001	Concentrate	Flanged DN100
ST01-TK002	ST01-TK002-L01	ST01-TK002-L01-LT	OVERFLOW HOLDING TANK LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ST01_PFB06_50003	Proces water	Flanged DN150
ZF03-BA003	ZF03-BA003-L01	ZF03-BA003-L01-LT	FINAL CONCENTRATE SUMP LEVEL	Ultrasonic Level Transmitter	900853_MCP01_ZF03_PFB06_40005	Concentrate	Supported
ZF03-BA002	ZF03-BA002-L01	ZF03-BA002-L01-LT	2ND CLEANER TAILINGS SUMP LEVEL	Ultrasonic Level Transmitter	900853_MCP01_ZF03_PFB06_40004	Tailings	Supported
ZF03-BA001	ZF03-BA001-L01	ZF03-BA001-L01-LT	2ND CLEANER CONCENTRATE SUMP LEVEL	Ultrasonic Level Transmitter	900853_MCP01_ZF03_PFB06_40003	Concentrate	Supported
ZF02-BA002	ZF02-BA002-L01	ZF02-BA002-L01-LT	1ST CLEANER TAILINGS SUMP LEVEL	Ultrasonic Level Transmitter	900853_MCP01_ZF02_PFB06_30004	Tailings	Supported
ZF02-BA001	ZF02-BA001-L01	ZF02-BA001-L01-LT	1ST CLEANER CONCENTRATE SUMP LEVEL	Ultrasonic Level Transmitter	900853_MCP01_ZF02_PFB06_30003	Concentrate	Supported
ZF02-RC001	ZF02-RC001-L01	ZF02-RC001-L01-LT	ROUGHER CONDITIONER LEVEL	Ultrasonic Level Transmitter	900853_MCP01_ZF02_PFB06_30001	Slurry	Flanged DN80
ZF01-BA003	ZF01-BA003-L01	ZF01-BA003-L01-LT	FINAL TAILINGS SUMP LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ZF01_PFB06_10005	Tailings	Supported
ZF01-BA002	ZF01-BA002-L01	ZF01-BA002-L01-LT	SCAVENGER CONCENTRATE SUMP LEVEL	Ultrasonic Level Transmitter	900853_MCP01_ZF01_PFB06_10007	Concentrate	Supported
ZF01-BA001	ZF01-BA001-L01	ZF01-BA001-L01-LT	ROUGHER CONCENTRATE SUMP LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ZF01_PFB06_10004	Concentrate	Supported
ZF01-RC001	ZF01-RC001-L01	ZF01-RC001-L01-LT	ROUGHER CONDITIONER LEVEL	Ultrasonic Level Transmitter	900853_MCP01_ZF01_PFB06_10001	Concentrate	Flanged DN80
ZG03-BA102	ZG03-BA102-L01	ZG03-BA102-L01-LT	REGRIND FEED SUMP LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ZG03_PFB06_20003	Slurry	Supported
ZG03-BA101	ZG03-BA101-L01	ZG03-BA101-L01-LT	REGRINDING DISCHARGE SUMP LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ZG03_PFB06_20002	Slurry	Supported
ZG03-BA001	ZG03-BA001-L01	ZG03-BA001-L01-LT	TERTIARY GRINDING SUMP LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ZG03_PFB06_00002	Slurry	Supported
ZG02-BA003	ZG02-BA003-L01	ZG02-BA003-L01-LT	GRINDING CIRCUIT #3 HC FEED SUMP LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ZG02_PFB06_00012	Slurry	Supported
ZG02-BA002	ZG02-BA002-L01	ZG02-BA002-L01-LT	GRINDING CIRCUIT #2 HC FEED SUMP LEVEL CONTROL	Ultrasonic Level Transmitter	900853_MCP01_ZG02_PFB06_00009	Slurry	Supported
ZG02-BA001	ZG02-BA001-L01	ZG02-BA001-L01-LT	GRINDING CIRCUIT #1 HC FEED SUMP LEVEL	Ultrasonic Level Transmitter	900853_MCP01_ZG02_PFB06_00007	Slurry	Supported

**APPENDIX 7 : PRESSURE TRANSMITTERS**

<b>Appendix 7 : Pressure transmitters</b>							
<b>Equipment/Pipe Ref</b>	<b>Tag</b>	<b>Loop Description</b>	<b>Function Description</b>	<b>PI-Diagrams</b>	<b>Process Medium</b>	<b>Main PipeSize</b>	<b>Pressure CL</b>
AG30-TK001	AG30-TK001-P01-PT	PROCESS WATER MAIN LINE PRESSURE	Pressure transmitter, general	900853_MCP01_AG30_PFB06_80003	PROCESS WATER	400 mm	PN10
AG20-AIN-80001	AG20-AIN-80001-P01-PT	INSTRUMENT AIR MAIN LINE PRESSURE	Pressure transmitter, general	900853_MCP01_AG20_PFB06_80001	INSTRUMENT AIR	100 mm	PN16
ZF01-AFL-10121	ZF01-FA001-P01-PT	FLOTATION AIR MAIN LINE PRESSURE	Pressure transmitter, general	900853_MCP01_ZF01_PFB06_10006	FLOTATION AIR	400 mm	PN6
AG35-PU001	AG35-PU001-P01-PT	GLAND SEAL WATER ML PRESSURE	Pressure transmitter, general	900853_MCP01_AG35_PFB06_90004	PROCESS WATER	32 mm	PN16
AG35-PU001	AG35-PU001-P01-PT	GLAND SEAL WATER ML PRESSURE	Pressure transmitter, general	900853_MCP01_AG35_PFB06_90002	PROCESS WATER	80 mm	PN10
AE02-WFR-90001	AE02-WFR-90001-P01-PT	SAFETY SHOWER WATER PRESSURE	Pressure transmitter, general	900853_MCP01_AE02_PFB06_90001	FRESH WATER	50 mm	PN10
AA01-TK001	AA01-TK001-P01-PT	LIME MILK DISTRIBUTION LINE PRESSURE	Pressure transmitter, with chemical seal	900853_MCP01_AA01_PFB06_70005	LIME MILK	50 mm	PN10
ZG03-GM101	ZG03-GM101-P01-PT	HIG MILL INLET PRESSURE	Pressure transmitter, with chemical seal	900853_MCP01_ZG03_PFB06_20004	MILL SLURRY	100 mm	PN10
ST01-TK002	ST01-TK002-P01-PT	FROTH SPRAY PROCESSE WATER MLP	Pressure transmitter, general	900853_MCP01_ST01_PFB06_50003	PROCESS WATER	80 mm	PN10
SF01-TK002	SF01-TK002-P01-PT	FILTRATE MAIN LINE PRESSURE	Pressure transmitter, with chemical seal	900853_MCP01_SF01_PFB06_60004	FILTRATE	50 mm	PN10
SF01-TK003	SF01-TK003-P01-PT	PROCESS WASH WATER ML PRESSURE	Pressure transmitter, general	900853_MCP01_SF01_PFB06_60006	PROCESS WATER	40 mm	PN10



**APPENDIX 8 : PRESSURE GAUGE**

Appendix 8 : Pressure gauge								
Equipment Ref	Tag	Loop Description	Function Description	PI-Diagrams	Process Medium	Line size (mm)	Connection	Pressure CL
ZG02-PU008	ZG02-PU008-P01-PG	MILLS #6 AND #7 SUMP PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG02_PFB06_00011	MILL SLURRY	250	Flanged	PN10
ZG02-PU007	ZG02-PU007-P01-PG	MILLS #6 AND #7 SUMP PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG02_PFB06_00011	MILL SLURRY	250	Flanged	PN10
AA01-PU002	AA01-PU002-P01-PG	LIME MILK CIRCULATION PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_AA01_PFB06_70005	LIME MILK	50	Flanged	PN10
AA01-PU001	AA01-PU001-P01-PG	LIME MILK CIRCULATION PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_AA01_PFB06_70005	LIME MILK	50	Flanged	PN10
SF01-PU004	SF01-PU004-P01-PG	FILTRATE PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_SF01_PFB06_60004	FILTRATE	50	Flanged	PN10
SF01-PU003	SF01-PU003-P01-PG	FILTRATE PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_SF01_PFB06_60004	FILTRATE	50	Flanged	PN10
SF01-PU001	SF01-PU001-P01-PG	DRYING AIR RECEIVER PRESSURE GAUGE	Pressure Gauge	900853_MCP01_SF01_PFB06_60005	Air drying	-	Flanged	PN16
SF01-PU002	SF01-PU001-P01-PG	FILTER FEED PUMP PRESSURE GAUGE	Pressure Gauge	900853_MCP01_SF01_PFB06_60001	Flotation concentrate	100	Flanged	PN10
SF01-PU001	SF01-PU001-P01-PG	FILTER FEED PUMP PRESSURE GAUGE	Pressure Gauge	900853_MCP01_SF01_PFB06_60001	Flotation concentrate	100	Flanged	PN10
ST01-PU006	ST01-PU006-P01-PG	THICKENER OVERFLOW PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ST01_PFB06_50003	PROCESS WATER	100	Flanged	PN10
ST01-PU005	ST01-PU005-P01-PG	THICKENER OVERFLOW PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ST01_PFB06_50003	PROCESS WATER	100	Flanged	PN10
ST01-PU004	ST01-PU004-P01-PG	THICKENER UNDERFLOW PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ST01_PFB06_50002	Flotation concentrate	100	Flanged	PN10
ST01-PU003	ST01-PU003-P01-PG	THICKENER UNDERFLOW PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ST01_PFB06_50002	Flotation concentrate	100	Flanged	PN10
ST01-PU002	ST01-PU002-P01-PG	THICKENER FEED PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ST01_PFB06_50001	Flotation concentrate	100	Flanged	PN10
ST01-PU001	ST01-PU001-P01-PG	THICKENER FEED PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ST01_PFB06_50001	Flotation concentrate	100	Flanged	PN10
ZF03-PU006	ZF03-PU006-P01-PG	FINAL CONCENTRATE PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF03_PFB06_40005	Flotation concentrate	150	Flanged	PN10
ZF03-PU005	ZF03-PU005-P01-PG	FINAL CONCENTRATE PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF03_PFB06_40005	Flotation concentrate	150	Flanged	PN10
ZF03-PU004	ZF03-PU004-P01-PG	2ND CLEANER TAILINGS SUMP PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF03_PFB06_40004	Flotation Tailings	100	Flanged	PN10
ZF03-PU003	ZF03-PU003-P01-PG	2ND CLEANER TAILINGS SUMP PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF03_PFB06_40004	Flotation Tailings	100	Flanged	PN10
ZF03-PU002	ZF03-PU002-P01-PG	2ND CLEANER CONCENTRATE PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF03_PFB06_40003	Flotation concentrate	100	Flanged	PN10
ZF03-PU001	ZF03-PU001-P01-PG	2ND CLEANER CONCENTRATE PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF03_PFB06_40003	Flotation concentrate	100	Flanged	PN10
ZF02-PU004	ZF02-PU004-P01-PG	1ST CLEANER TAILINGS SUMP PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF02_PFB06_30004	Flotation Tailings	200	Flanged	PN10
ZF02-PU003	ZF02-PU003-P01-PG	1ST CLEANER TAILINGS SUMP PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF02_PFB06_30004	Flotation Tailings	200	Flanged	PN10
ZF02-PU002	ZF02-PU002-P01-PG	1ST CLEANER CONCENTRATE PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF02_PFB06_30003	Flotation concentrate	100	Flanged	PN10
ZF02-PU001	ZF02-PU001-P01-PG	1ST CLEANER CONCENTRATE PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF02_PFB06_30003	Flotation concentrate	100	Flanged	PN10
ZF01-PU004	ZF01-PU004-P01-PG	SCAVENGER SUMP PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF01_PFB06_10007	Flotation concentrate	80	Flanged	PN10
ZF01-PU003	ZF01-PU003-P01-PG	FILTRATE SUMP PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF01_PFB06_10007	Flotation concentrate	80	Flanged	PN10
ZF01-PU006	ZF01-PU006-P01-PG	FINAL TAILINGS SUMP PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF01_PFB06_10005	Flotation concentrate	400	Flanged	PN10
ZF01-PU005	ZF01-PU005-P01-PG	FINAL TAILINGS SUMP PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF01_PFB06_10005	Flotation concentrate	400	Flanged	PN10
ZF01-PU002	ZF01-PU002-P01-PG	ROUGHER CONCENTRATE SUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF01_PFB06_10004	Flotation concentrate	200	Flanged	PN10
ZF01-PU001	ZF01-PU001-P01-PG	ROUGHER CONCENTRATE SUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZF01_PFB06_10004	Flotation concentrate	200	Flanged	PN10
ZG03-PU109	ZG03-PU109-P01-PG	REGRINDING MILL FEED PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG03_PFB06_20003	Flotation concentrate	100	Flanged	PN10
ZG03-PU108	ZG03-PU108-P01-PG	REGRINDING MILL FEED PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG03_PFB06_20003	Flotation concentrate	100	Flanged	PN10
ZG03-PU102	ZG03-PU102-P01-PG	REGRINDING DISCHARGE PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG03_PFB06_20002	Flotation concentrate	150	Flanged	PN10
ZG03-PU101	ZG03-PU101-P01-PG	REGRINDING DISCHARGE PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG03_PFB06_20002	Flotation concentrate	150	Flanged	PN10
ZG03-PU002	ZG03-PU002-P01-PG	TERTIARY HC CLUSTER FEED PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG03_PFB06_00002	MILL SLURRY	450	Flanged	PN10
ZG03-PU001	ZG03-PU001-P01-PG	TERTIARY HC CLUSTER FEED PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG03_PFB06_00002	MILL SLURRY	450	Flanged	PN10
ZG02-PU006	ZG02-PU006-P01-PG	GRINDING CIRCUIT #3 HC FEED PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG02_PFB06_00012	MILL SLURRY	200	Flanged	PN10
ZG02-PU005	ZG02-PU005-P01-PG	GRINDING CIRCUIT #3 HC FEED PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG02_PFB06_00012	MILL SLURRY	200	Flanged	PN10
ZG02-PU004	ZG02-PU004-P01-PG	GRINDING CIRCUIT #2 HC FEED PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG02_PFB06_00009	MILL SLURRY	200	Flanged	PN10
ZG02-PU003	ZG02-PU003-P01-PG	GRINDING CIRCUIT #2 HC FEED PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG02_PFB06_00009	MILL SLURRY	200	Flanged	PN10
ZG02-PU002	ZG02-PU002-P01-PG	GRINDING CIRCUIT #1 HC FEED PUMP 2 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG02_PFB06_00007	MILL SLURRY	200	Flanged	PN10
ZG02-PU001	ZG02-PU001-P01-PG	GRINDING CIRCUIT #1 HC FEED PUMP 1 PRESSURE GAUGE	Pressure Gauge	900853_MCP01_ZG02_PFB06_00007	MILL SLURRY	200	Flanged	PN10

**APPENDIX 9 : THERMOMETERS**

<b>Appendix 9 : Thermometers</b>							
<b>Equipment/Pipe Ref</b>	<b>Tag</b>	<b>Loop Description</b>	<b>Function Description</b>	<b>PI-Diagrams</b>	<b>Process Medium</b>	<b>Pipe Size</b>	<b>Pressure CL</b>
ZF01-AFL-10121	ZF01-FA001-T01-TE	FLOTATION AIR MAIN LINE TEMPERATURE	Thermometer	900853_MCP01_ZF01_PFB06_10006	Flotation air	300mm	PN10
AE02-WFR-90001	AE02-WFR-90001-T01-TE	SAFETY SHOWER WATER TEMPERATURE	Thermometer	900853_MCP01_AE02_PFB06_90001	Fresh water	50mm	PN10