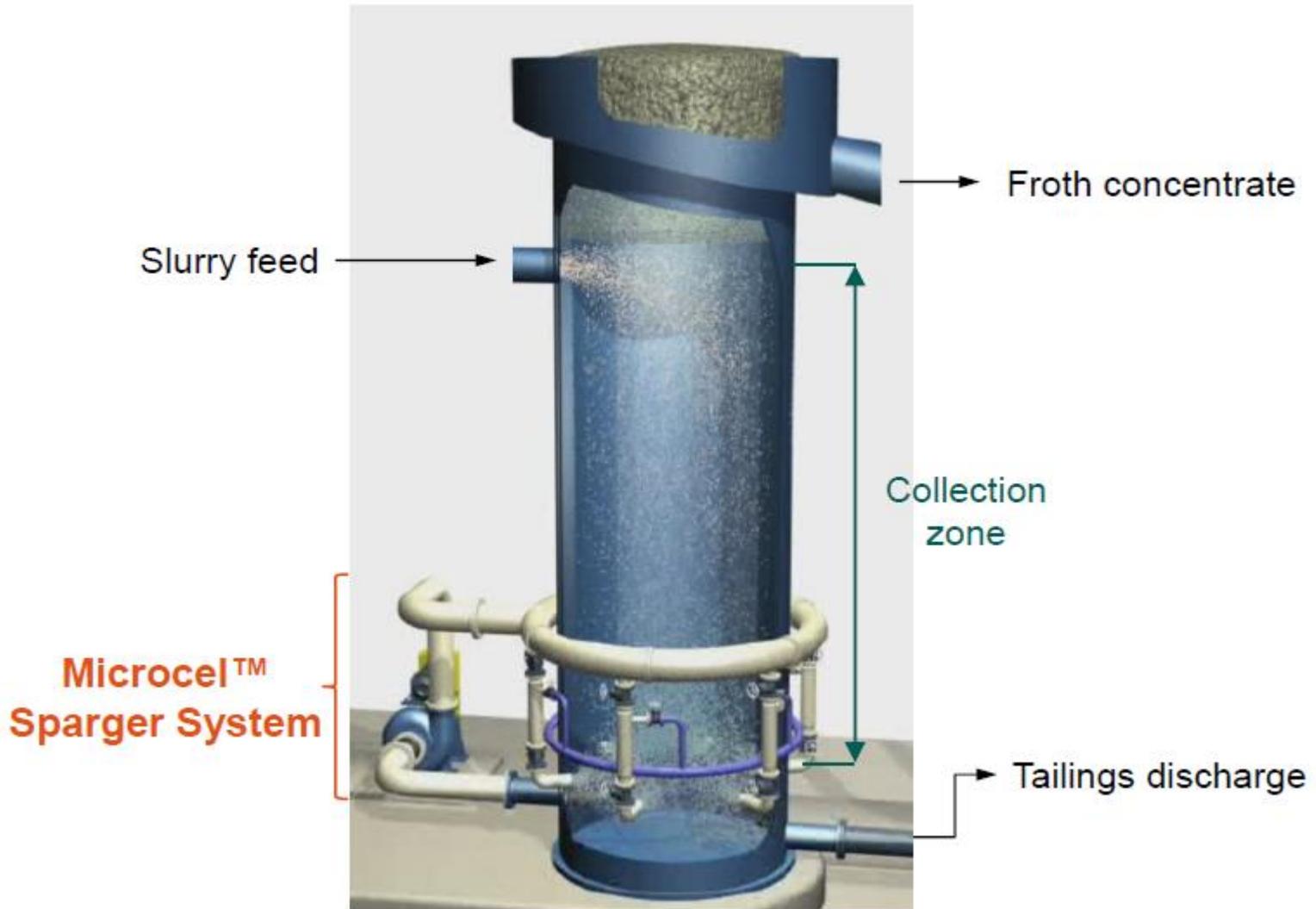
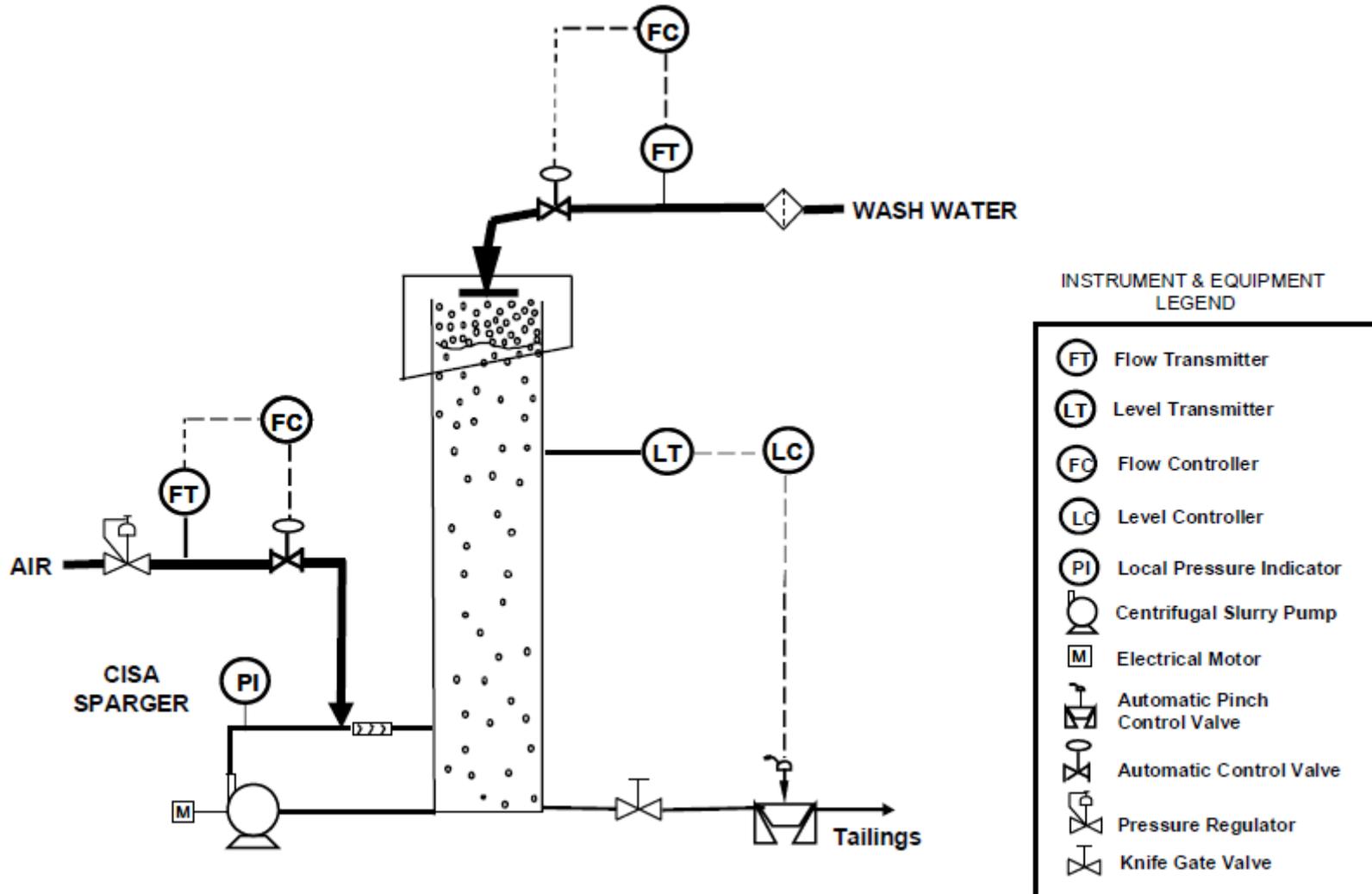


METSO COLUMN CELL

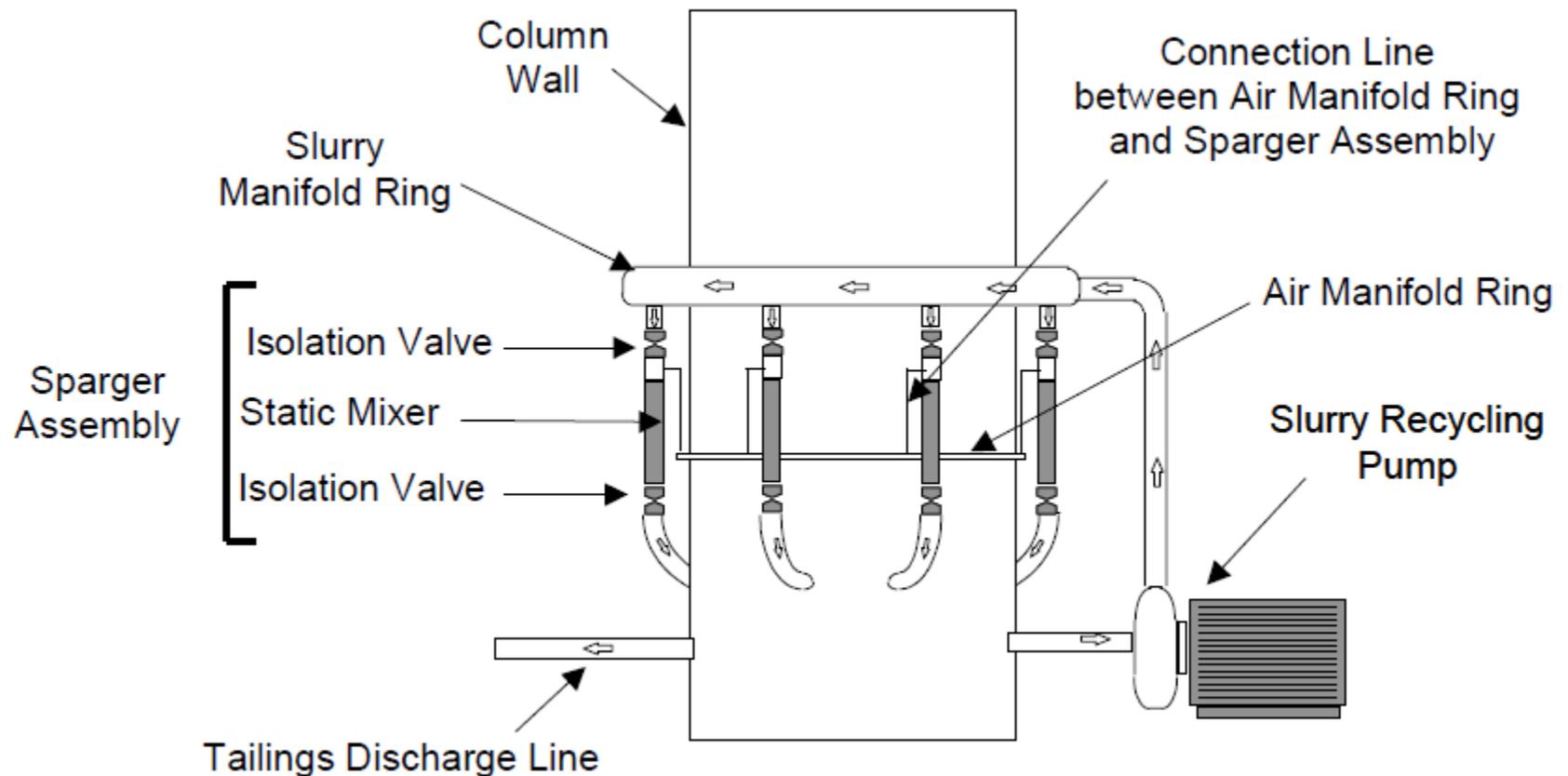
CIS/MicroCel™ Flotation Column



Typical P&ID for Metso Column cell



Microcel™ Sparger System for an Industrial Column



Microcel™ Sparger System

- The Microcel™ sparger system is an externally mounted bubble generator which requires low air pressure (4 bars) and recirculation of non-floated slurry used as a mixing medium for the air.
- The sparger incorporates in-line static mixers and a centrifugal pump as illustrated in the figure hereafter.
- Slurry is pumped from the base of the column through static mixers, where air and slurry are mixed under high-shear conditions to create the bubble dispersion.
- As the air-slurry mixture passes through the stationary blades located within the mixer, the air is sheared into very small bubbles by the intense turbulence.
- The bubble-slurry mixture is introduced near the column base, and bubbles rise through the column collection zone.
- The number of static mixers and the amount of slurry recycled (pump size) are determined by the air requirements for each particular flotation application

Microcel™ sparger installation on Cu Application



Level Control System Specifications

- For stable column operation, a slurry level (or slurry/froth interface) control is required in order to keep a constant froth height.
- Slurry level within the column is maintained at a set point specified by the operator by varying the opening of an automatic pinch valve at the column tailings discharge.
- Slurry level in the column is measured by mean of a float/target assembly with an ultrasonic sensor. The ultrasonic sensor sends a 4-20 mA signal to the level controller. The level controller output sends a 4-20 mA signal to the automatic pinch valve positioner.
- On the tailings line upstream of the flow control valve, one isolation knife gate valve is installed.

Level Control System Specifications

- For each column cell, the level control system requires the following equipment and instrumentation (except indicated otherwise, the equipment/instrumentation is included in Metso scope of delivery):

	Microcel™ Column Flotation Cells
• Float/target assembly with ultrasonic sensor	One
• Tailings automatic flow control pinch valve	One
• Single loop PID controller	<i>Integrated in the plant control system</i>
• Tailings isolation knife gate valve with pneumatic actuator	One
• Drain knife gate valve with pneumatic actuator	One

Wash Water System

- The main wash water manifold allows automatic control of the wash water flow. It is located on the top platform of the flotation column.
- Wash water flow is measured with an electro-magnetic flowmeter mounted on the wash water manifold. The flowmeter incorporates a flow transmitter that sends a 4-20 mA signal to the wash water flow controller.
- The wash water flow controller sends a 4-20 mA signal to the water flow control ball valve positioner. Wash water flowrate setpoint is manually adjusted by the operator.

Wash Water System

For each column cell, the following equipment and instrumentation are included in Metso's delivery:

	Microcel™ Column Flotation Cells
<ul style="list-style-type: none"> • General wash water line manifold equipped with: <ul style="list-style-type: none"> - strain filter - water electromagnetic flowmeter - automatic flow control valve - single loop PID controller - ball valves and piping with by-pass line 	<p style="text-align: center;">One</p> <p style="text-align: center;">One</p> <p style="text-align: center;">One</p> <p style="text-align: center;"><i>Integrated in the plant control system</i></p> <p style="text-align: center;">One set</p>
<ul style="list-style-type: none"> • Wash water distribution system with drip pan 	One set
<ul style="list-style-type: none"> • Launder flush water ring manifold with spray systems 	One