



## YMC EcoPrime® Buffer In-Line Dilution (EcoPrime BID)

Delivers consistent, point-of-use buffers from concentrates.

### Automated buffer preparation that breaks the bottleneck

Downstream processing of monoclonal antibodies and other recombinant proteins requires large volumes of buffer to maintain pH and conductivity during chromatographic purification steps and to stabilize proteins during hold steps and processing. A typical cell culture from a 1,000L bioreactor requires between 15,000 and 20,000L of buffer for the subsequent processing steps.

The large volumes coupled with improvements made upstream in titers are now putting even more pressure on downstream capacity. Buffer preparation must be carefully planned and is often the bottleneck in the downstream operations.

YMC EcoPrime Buffer In-Line Dilution (BID) systems produce a broad range of process-ready buffers in different capacities while meeting critical process parameters. Implementation of EcoPrime BID systems reduces the labor costs and space associated with manual batch buffer preparation and storage as well as enables the use of concentrated buffers (lower cost and smaller footprint) and single-use technology (convenience and cost).

### EcoPrime BID 17 - Flow Rate and Dilution Factor Ranges

| Total Flow (L/min) | 1x | 5x | 10x | 20x | 50x |
|--------------------|----|----|-----|-----|-----|
| 0.5                | ✓  | ×  | ×   | ×   | ×   |
| 1                  | ✓  | ✓  | ×   | ×   | ×   |
| 2                  | ✓  | ✓  | ×   | ×   | ×   |
| 7                  | ✓  | ✓  | ✓   | ✓   | ×   |
| 10                 | ✓  | ✓  | ✓   | ✓   | ×   |
| 14                 | ✓  | ✓  | ✓   | ✓   | ✓   |
| 17                 | ✓  | ✓  | ✓   | ✓   | ✓   |

### Best-in-class design delivers unrivalled performance

The system consists of YMC ecodos® metering pumps with intellidrive®, our proprietary digital control technology, and sensors to monitor the dilution process. System software and automation allows the user to configure and run recipes that accurately and precisely blend the constituent solutions to produce ready-to-use buffers.

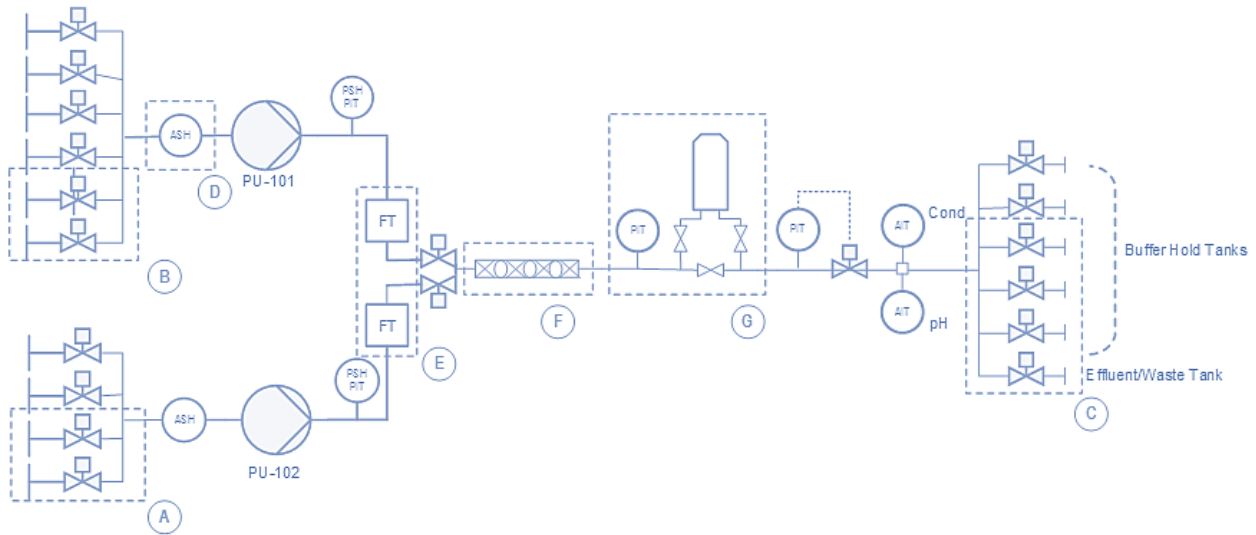
- Automatically prepares accurate and precise buffers at point-of-use or central location.
- Enables dilution factors of at least 50:1 with  $\leq \pm 1.0\%$  variation in accuracy and precision.
- Robust and simple buffer dilution based on control with volumetric flow rate to ensure consistent buffer ion composition.
- Fluidic design that facilitates mixing, reduces time required to reach set points, and enables drainability.
- User adaptable software that is recipe-driven with configurable, pre-programmed sequences that minimizes operator intervention.

### EcoPrime BID 33 - Flow Rate and Dilution Factor Ranges

| Total Flow (L/min) | 1x | 5x | 10x | 20x | 50x |
|--------------------|----|----|-----|-----|-----|
| 1                  | ✓  | ×  | ×   | ×   | ×   |
| 6                  | ✓  | ×  | ×   | ×   | ×   |
| 9                  | ✓  | ✓  | ✓   | ×   | ×   |
| 13                 | ✓  | ✓  | ✓   | ✓   | ×   |
| 20                 | ✓  | ✓  | ✓   | ✓   | ×   |
| 26                 | ✓  | ✓  | ✓   | ✓   | ✓   |
| 33                 | ✓  | ✓  | ✓   | ✓   | ✓   |

# YMC EcoPrime BID

## Flow schematic for standard platform



### YMC EcoPrime BID

### Models

| Base Unit                 | EP BID 17           | EP BID 33           |
|---------------------------|---------------------|---------------------|
| Pump (diluent/WFI)        | LEWA ecodos LEE 350 | LEWA ecodos LEF 550 |
| Pump (buffer concentrate) | LEWA ecodos LED 180 | LEWA ecodos LEE 350 |

### Base Model Features

|                          |                       |
|--------------------------|-----------------------|
| Inlets - Diluent Pump    | 2                     |
| Inlets - Buffer Pump     | 4                     |
| Outlets                  | 2 (1 buffer, 1 waste) |
| Air Sensor – Buffer Pump | 1                     |
| pH Sensor                | 1                     |
| Conductivity Sensor      | 1                     |
| Pressure transmitters    | 3                     |

### System Options

|                             |                     |
|-----------------------------|---------------------|
| A Inlets –Diluent Pump      | 2 additional valves |
| B Inlets - Buffer Pump      | 2 additional valves |
| C Outlets                   | 4 additional valves |
| D Air Sensor – Diluent Pump | 1                   |
| E Flow Meter                | 2                   |
| F Static Mixer              | 1                   |
| G Filter Housing            | 1                   |
| H CIP Manifolds (not shown) | 2                   |

## Volumetric flow control based buffer dilution

Digitally-controlled, hygienic LEWA ecodos pumps deliver precise and accurate flow of both buffer concentrate and diluent across a wide flow rate range assuring better control of final buffer composition and minimizing variation of critical quality attributes (ionic strength, concentration, pH, and conductivity). This straightforward process control reduces the need for in-process adjustments facilitating validation.

## Quality and regulatory considerations

As with all YMC bioprocess equipment, the EcoPrime BID system is designed to meet high quality expectations. The design and construction of the equipment meets the following standards, assuring a safe, ergonomic system capable of producing the product within the guidelines of the FDA:

- System designed for GMP operation and validation
- Enables 21 CFR part 11 compliance
- USP Class VI o-rings and gaskets
- Compliance to ASME-BPE
- YMC hygienic metering pumps are EHEDG certified (European Hygienic Engineering & Design Group)
- CE conformity

## EcoPrime BID delivers the following process benefits

- Smaller tanks, less footprint, reduced CIP volume and waste, leaner operation
- Less operator exposure to potential chemical hazards
- Reduced labor costs for buffer preparation
- Reproducible and accurate buffer compositions are achieved with dilution based on volumetric flow control
- Enables single use (concentrates in bags) increasing process scheduling flexibility

## System Specifications

|                            |  |
|----------------------------|--|
| System                     | Flow rate range                            |
| EcoPrime BID 17            | 0.06 – 17 L/min                            |
| EcoPrime BID 33            | 0.12 – 33 L/min                            |
| Dilution range             | Up to 50 to 1                              |
| Operating pressure         | 6 bar                                      |
| Ambient temperature range  | 4 – 25 °C                                  |
| Process temperature range  | 4 – 40 °C                                  |
| pH range                   | 0 – 13                                     |
| Conductivity range         | 0 – 200 mS/cm                              |
| Skid size (LxWxH)          |  |
| EcoPrime BID 17            | 90 x 45 x 80 in.<br>(230 x 115 x 205 cm)   |
| EcoPrime BID 33            | 110 x 55 x 100 in.<br>(280 x 140 x 254 cm) |
| Skid weight                |  |
| EcoPrime BID 17            | 1750 lb (800 kg)                           |
| EcoPrime BID 33            | 1900 lb (860 kg)                           |
| Enclosure protection class | UL Type 4x/IP65                            |
| Materials of construction  | 316L stainless steel                       |

NOTE: Skid size and weight vary with installed options.





### The future provides broader solutions for our customers

The innovation and growth of this and other EcoPrime product lines has attracted the attention of leading technology suppliers and users. YMC Co., Ltd. assumed all rights and production for the EcoPrime suite of systems in late 2018 from LEWA-Nikkiso America, Inc. This acquisition brings a broad spectrum of chromatographic resins, and columns ideal for large and small molecule purification. More about this new chapter for EcoPrime at [www.ymcamerica.com](http://www.ymcamerica.com).

### Ordering information

To order the EcoPrime BID system, please contact your regional sales representative.

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