The next generation of efficiency and performance
The Thermo Scientific™ HyPerforma™ Single-Use Mixer (S.U.M.) with Touchscreen Console offers enhanced functionality, ease of use, and efficiency. The complete HyPerforma S.U.M. system consists of a mixer tank, available in 50, 100, 200, 500, 1,000, and 2,000 L sizes, with the Touchscreen Console. The HyPerforma S.U.M. has a 5:1 turndown mixing ratio and maintains traditional stirred-tank mixer design principles with a directly coupled motor impeller drive assembly and a cylindrical tank with a specific height-to-diameter ratio. This allows quick turnaround times for both liquid-to-liquid mixing and powder-to-liquid mixing.

50 L HyPerforma S.U.M. standard configurations
• DC motor
• 3x load cell weighing system
• Touchscreen Console

Critical upstream application steps
• Media preparation
• Final formulation steps
• Buffer preparation
• Large-volume mixing

Critical downstream application steps
• Pooling and liquid transfer
• Product suspension
• Mixing and storing multiple batches
• Buffer preparation
• Viral inactivation

Touchscreen Console capabilities
The Touchscreen Console offers state-of-the-art in-process monitoring and automation capability for the HyPerforma S.U.M. Its modular design allows for an easy-to-use custom user interface. Capabilities include control of agitation speed, pumps, pinch clamps, and the temperature control unit (TCU). Users can easily view measurements from load cells, pH sensors, conductivity sensors, resistance temperature detectors (RTDs), and pressure sensors.

Simple, routine processes can be automated by utilizing measurement values to control the pumps, temperature control unit (TCU), and agitation motor. The Touchscreen Console can help users semi-automate their formulation, pH, or saline titrations, and viral inactivation processes. This allows users to program their HyPerforma S.U.M. for a process and trust that the measurements are accurate, precise, and controlled. The data measured during a process can be exported remotely via Ethernet, Profinet, or Modbus remote terminal unit (RTU), and can also be accessed locally with a USB flash drive.
HyPerforma S.U.M. design features and options

1. Powder hanger for 1 kg, 5 kg, and 25 kg Thermo Scientific™ Powdertainer™ BioProcess Containers (BPCs)
2. Mixing assembly with shield
3. Bearing port receiver with clamp
4. Mixer motor
5. Shelves and basket (optional)
6. Drive shaft, stored
7. Liquid sight window
8. Touchscreen Console
9. Probe clip hangers
10. Probe access windows
11. Cart assembly
12. Standard tool set: 10 mm (3/8 in.) x 16.9 N-m (150 in.-lb.) square torque wrench; load cell and motor cap lockout wrench
13. 0.95 cm (3/8 in.) dimpled jacket
14. Stainless steel outer support container
15. Handles with cable management clips
16. Bottom cutouts/pins for BPC attachment and alignment
17. Bleed valve (jacketed models only)
18. 3.8 cm (1.5 in.) tri-clamp connection ports for water inlet/outlet (jacketed models only)
19. Casters (2 swiveling, 2 fixed)

Note: Models without water jackets include the same features as the water-jacketed models shown here, but without the jacket and inlet/outlet ports. Optional load cells and cable management system are not shown. See the accessories section for more information about these items.
HyPerforma S.U.M. design specifications

HyPerforma S.U.M. DeltaV capability enhancement
As an engineer-to-order product, the Thermo Scientific™ HyPerforma™ Single-Use Mixer (S.U.M.) with Touchscreen Console can be fully integrated with either Thermo Scientific™ HyPerforma™ G3 Bioprocess Controllers or controllers from other manufacturers—providing an open-architecture mixing solution configured to your unique requirements. The Touchscreen Console has the capability to integrate Thermo Scientific™ TruBio™ automation software powered by the DeltaV™ Distributed Control Platform from Emerson, enabling users to optimize data acquisition while maintaining full compliance with 21 CFR Part 11.

Touchscreen Console measurement options and specifications

<table>
<thead>
<tr>
<th></th>
<th>Load cell</th>
<th>Temperature</th>
<th>pH</th>
<th>Conductivity</th>
<th>BPC and in-line liquid pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy after calibration</td>
<td>±0.5% of full scale</td>
<td>0.2°C</td>
<td>±0.05 pH unit</td>
<td>±5%</td>
<td>±3.5% of full scale (30 psi)</td>
</tr>
<tr>
<td>Calibration</td>
<td>1 to 3 points and</td>
<td>1 to 3 points</td>
<td>1 to 3 points</td>
<td>1 point; zero/tare function</td>
<td></td>
</tr>
<tr>
<td></td>
<td>zero/tare function</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1 kg</td>
<td>0.01°C</td>
<td>0.01 pH unit</td>
<td>1 µS/cm</td>
<td>0.01 psi</td>
</tr>
<tr>
<td>Sensor range</td>
<td>0 to 300 kg</td>
<td>0 to 200°C</td>
<td>0 to 14</td>
<td>20 to 20,000 µS/cm</td>
<td>0 to 30 psi</td>
</tr>
<tr>
<td>Measurement unit</td>
<td>kg</td>
<td>°C</td>
<td>pH unit</td>
<td>µS/cm</td>
<td>psi</td>
</tr>
<tr>
<td>Probe type</td>
<td>3 x Mettler Toledo™MTB load cells</td>
<td>RTD</td>
<td>Electrochemical with 225 mm S8 connector</td>
<td>Two-pole conductivity sensor</td>
<td>Single-use sensor part of the BPC and/or fluid transfer assembly design</td>
</tr>
</tbody>
</table>
**Accessories**

**Sensors and pinch valves**

Reusable pH and conductivity probes as well as single-use pressure sensors have been approved and qualified for use with the Touchscreen Console. pH and conductivity measurements can be used to control titration pumps, which enable automatic titration capabilities. Pressure sensors are used in the BPC or line sets to monitor the BPC or liquid pressure, respectively. The BPC can be filled with the proper amount of air when using the pressure sensor in the BPC. The liquid pressure module in the Touchscreen Console is used to control a transfer pump, based on the liquid pressure. Optional pneumatic pinch valves can be used on the fill and harvest lines. These valves automatically open and shut when using the fill and/or harvest modules in the Touchscreen Console.

**Ordering information**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Manufacturer</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH sensor</td>
<td>Thermo Fisher Scientific SV51147.02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mettler Toledo</td>
<td>SV51147.01</td>
</tr>
<tr>
<td></td>
<td>Broadley James</td>
<td>SV51147.03</td>
</tr>
<tr>
<td>Conductivity sensor</td>
<td>JUMO</td>
<td>SV51148.01</td>
</tr>
<tr>
<td></td>
<td>Mettler Toledo</td>
<td>SV51148.02</td>
</tr>
<tr>
<td>Pressure sensor (single-use, included in BPC and/or fluid transfer assembly)</td>
<td>PendoTECH 3/8 in. ID tubing</td>
<td>SV20826.05</td>
</tr>
<tr>
<td></td>
<td>PendoTECH 1/2 in. ID tubing</td>
<td>SV20826.01</td>
</tr>
<tr>
<td>Pinch valve, harvest line</td>
<td>Thermo Fisher Scientific SV51108.08</td>
<td></td>
</tr>
<tr>
<td>Pinch valve, fill line</td>
<td>Thermo Fisher Scientific SV51108.05</td>
<td></td>
</tr>
</tbody>
</table>

**Heavy-duty tubing clamps**

Heavy-duty clamps are used to pinch off line sets that are not in use, to prevent process fluids from escaping. Prior to insertion of sterile probes, tubing clamps must be in place to close off probe ports.

**Ordering information**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heavy-duty tubing clamp (single)</td>
<td>SV20664.01</td>
</tr>
<tr>
<td>Heavy-duty tubing clamp (10 pack)</td>
<td>SV20664.04</td>
</tr>
</tbody>
</table>

**Load cells**

Load cells are typically radially mounted in sets of three. The mounting location varies slightly for each size in order to allow easy access to the bottom drain or sparging mechanisms and tubing.

**Probe clips**

Probe clips are used to hold the probes in place on the S.U.M. tank. The independently movable probe clips hang on a thin brace above the probe port tank cutout.

**Ordering information**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 plastic probe clips</td>
<td>SV50177P.01</td>
</tr>
</tbody>
</table>
Cable management system
The optional cable management system connects to the left side of the S.U.M. and is used to properly route tubing and cables along the side of the S.U.M.

Ordering information
<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable management system (50 L, 100 L)</td>
<td>SV50992.01</td>
</tr>
</tbody>
</table>

Powdertainer arm
A Powdertainer arm is available as an option for powder-to-liquid applications. It holds the container of powder above the mixer and attaches it to the BPC with a clamp. The arm adjusts vertically and swivels to enable convenient lifting of the Powdertainer BPC onto the hanger.

Ordering information
<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powdertainer arm (50 L–1,000 L)</td>
<td>SV51002.01</td>
</tr>
</tbody>
</table>

Autoclave tray and probe assembly
The autoclave tray holds the electrochemical probes and bellows in place during the autoclave sterilization process. Design elements include the following:

• Fabricated from stainless steel
• Plastic handle provides for easy transport right out of the autoclave
• Positions probes on 15% incline for greater probe and membrane longevity
• Prevents probe bellows from collapsing during sterilization
• Probe holder accommodates two probes

Ordering information
<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoclave tray (stainless steel with plastic carrying handle)</td>
<td>SV50177.01</td>
</tr>
</tbody>
</table>

Ordering information
<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powdertainer arm (50 L–1,000 L)</td>
<td>SV51002.01</td>
</tr>
</tbody>
</table>
# Standard 50 L S.U.M. hardware

## 50 L S.U.M. specifications

<table>
<thead>
<tr>
<th>Mixer geometry</th>
<th>Jacketed and non-jacketed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated liquid working volume</td>
<td>50 L</td>
</tr>
<tr>
<td>Minimum liquid working volume</td>
<td>10 L (complete impeller coverage)</td>
</tr>
<tr>
<td>Total chamber volume (liquid and gas)</td>
<td>80 L</td>
</tr>
<tr>
<td>BPC chamber diameter</td>
<td>34.9 cm (13.75 in.)</td>
</tr>
<tr>
<td>BPC chamber shoulder height</td>
<td>84.8 cm (33.4 in.)</td>
</tr>
<tr>
<td>Liquid height at rated working volume</td>
<td>52.1 cm (20.5 in.)</td>
</tr>
<tr>
<td>Fluid geometry at working volume (height:diameter ratio)</td>
<td>1.5:1</td>
</tr>
<tr>
<td>Hold-up volume</td>
<td>&lt;50 mL</td>
</tr>
<tr>
<td>Overall mixer geometry (height:diameter ratio)</td>
<td>1.9:1</td>
</tr>
<tr>
<td>Tank baffles</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impeller</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Impeller (quantity x blade count)</td>
<td>1 x 3</td>
</tr>
<tr>
<td>Impeller scaling (impeller diameter:tank diameter)</td>
<td>2:5</td>
</tr>
<tr>
<td>Impeller blade pitch (angle)</td>
<td>45°</td>
</tr>
<tr>
<td>Impeller diameter</td>
<td>14.6 cm (5.75 in.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agitation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixing rate range</td>
<td>30–356 rpm</td>
</tr>
<tr>
<td>Tip speed</td>
<td>15–272 cm/sec (28.5–535.4 ft/min)</td>
</tr>
<tr>
<td>Counterclockwise mixing flow direction</td>
<td>Down-pumping</td>
</tr>
<tr>
<td>Agitation shaft resolved angle</td>
<td>12.5°</td>
</tr>
<tr>
<td>Agitation shaft centerline offset</td>
<td>1.9 cm (0.75 in.)</td>
</tr>
<tr>
<td>Overall drive shaft length</td>
<td>91.7 cm (36.1 in.)</td>
</tr>
<tr>
<td>Drive shaft diameter</td>
<td>1.27 cm (0.5 in.)</td>
</tr>
<tr>
<td>Drive shaft poly-sheath outside diameter</td>
<td>2.54 cm (1 in.)</td>
</tr>
<tr>
<td>Impeller clearance from tank bottom</td>
<td>11.75 cm (4.6 in.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agitation motor drive (type, voltage, phase)</td>
<td>Brushless, 48 VDC</td>
</tr>
<tr>
<td>Motor power rating</td>
<td>400 W (0.536 hp)</td>
</tr>
<tr>
<td>Motor torque rating</td>
<td>8.6 N-m (76 in.-lb.)</td>
</tr>
<tr>
<td>Gear reduction</td>
<td>7.5:1</td>
</tr>
<tr>
<td>Motor communication methods (for external controller)</td>
<td>Via Touchscreen Console through communication ports</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling height required for drive shaft loading</td>
<td>228.6 cm (90 in.)</td>
</tr>
<tr>
<td>Electrical power rating</td>
<td>100–120 VAC, 50/60 Hz, single, 15 A</td>
</tr>
<tr>
<td></td>
<td>220–240 VAC, 50/60 Hz, single, 10.4 A</td>
</tr>
<tr>
<td>pH and dissolved oxygen (DO) probe—autoclavable type (Applisens, Broadley James, Mettler Toledo)</td>
<td>12 mm diameter x 215–235 mm insertion length x 13.5 PG (pipe) thread</td>
</tr>
<tr>
<td>Noise level</td>
<td>&lt;70 dB at 1.5 m</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>−25°C to 65°C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>20–80%, noncondensing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommended operating parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
<td>S.U.M.: 2–40 ± 0.1°C (36–104 ± 0.2°F)</td>
</tr>
<tr>
<td>DC motor: 0–40°C (32–104°F)</td>
<td></td>
</tr>
<tr>
<td>Motor speed</td>
<td>30–356 rpm</td>
</tr>
<tr>
<td>Volume range</td>
<td>10–50 L</td>
</tr>
<tr>
<td>Maximum static BPC pressure</td>
<td>0.03 bar (0.5 psi)</td>
</tr>
<tr>
<td>Maximum BPC pressure during operation</td>
<td>0.007 bar (0.1 psi)</td>
</tr>
<tr>
<td>Continuous operating time</td>
<td>21 days mixing at nominal volume only</td>
</tr>
</tbody>
</table>
## Standard 50 L S.U.M. hardware (cont.)

### 50 L S.U.M. specifications (cont.)

<table>
<thead>
<tr>
<th></th>
<th>Jacketed</th>
<th>Non-jacketed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fluid jacket</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jacket area: full/half volume</td>
<td>0.38 m²/0.32 m² (4.1 ft²/3.4 ft²)</td>
<td>–</td>
</tr>
<tr>
<td>Jacket volume</td>
<td>2 L (0.5 gal)</td>
<td>–</td>
</tr>
<tr>
<td>Jacket flow rate at 3.4 bar (50 psi)</td>
<td>99 L/min (26.4 gal/min)</td>
<td>–</td>
</tr>
<tr>
<td>Process connection</td>
<td>1 in. sanitary tri-clamp</td>
<td>–</td>
</tr>
<tr>
<td><strong>Temperature control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TCU model: maximum heating/cooling</td>
<td>TF2500: 2,800/2,500 W</td>
<td>–</td>
</tr>
<tr>
<td>Approximate liquid heat-up time (5–37°C)</td>
<td>1.2 hr</td>
<td>–</td>
</tr>
<tr>
<td>Approximate liquid cooldown time (37–5°C)</td>
<td>2.7 hr</td>
<td>–</td>
</tr>
<tr>
<td>RTD or thermocouple, 3.18 mm (1/8 in.) OD</td>
<td>Pt-100 (standard)</td>
<td>Pt-100 (standard)</td>
</tr>
<tr>
<td><strong>Support container</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall width</td>
<td>87 cm (34.1 in.)</td>
<td>87 cm (34.1 in.)</td>
</tr>
<tr>
<td>Overall length</td>
<td>86 cm (33.9 in.)</td>
<td>86 cm (33.9 in.)</td>
</tr>
<tr>
<td>Overall height (without Powdertainer arm)</td>
<td>152 cm (59.8 in.)</td>
<td>152 cm (59.8 in.)</td>
</tr>
<tr>
<td>Dry skid weight (mass)</td>
<td>164.1 kg (360.8 lb.)</td>
<td>145.1 kg (319.8 lb.)</td>
</tr>
<tr>
<td>Wet skid weight—rated working volume (mass)</td>
<td>214 kg (470.8 lb.)</td>
<td>195.1 kg (429.8 lb.)</td>
</tr>
<tr>
<td><strong>Touchscreen Console</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x H x D)</td>
<td>25 x 52 x 23 cm (9.9 x 20.5 x 9.3 in.)</td>
<td></td>
</tr>
<tr>
<td>Construction material</td>
<td>AISI 304 (stainless steel)</td>
<td></td>
</tr>
<tr>
<td>Pumps</td>
<td>Supports various pumps with 4–20 mA signal control</td>
<td></td>
</tr>
<tr>
<td>Load cells</td>
<td>Mettler Toledo MTB</td>
<td></td>
</tr>
<tr>
<td>pH sensors supported</td>
<td>Thermo Scientific, Mettler Toledo, and Broadley James</td>
<td></td>
</tr>
<tr>
<td>Conductivity sensors</td>
<td>JUMO, Mettler Toledo</td>
<td></td>
</tr>
<tr>
<td>Pinch valves</td>
<td>Bimba ACRO 935 pinch valve, 19 mm (3/4 in.) OD x 3.175 mm (1/8 in.) wall tubing</td>
<td></td>
</tr>
<tr>
<td>Human machine interface (HMI)</td>
<td>8.4 in. LCD panel with capacitive touchscreen</td>
<td></td>
</tr>
<tr>
<td>Alarms</td>
<td>Factory-set and user-defined</td>
<td></td>
</tr>
<tr>
<td>Communication ports</td>
<td>USB, Ethernet, Profibus, Modbus RTU</td>
<td></td>
</tr>
<tr>
<td>E-stop</td>
<td>Integrated safety circuit for entire system; external E-stop also available</td>
<td></td>
</tr>
<tr>
<td>Data recording</td>
<td>User-defined data record transfer via Ethernet, Profibus, or Modbus RTU. 72-hour data storage exportable via USB</td>
<td></td>
</tr>
<tr>
<td>File format</td>
<td>CSV</td>
<td></td>
</tr>
<tr>
<td>Data exporting</td>
<td>Local via USB flash drive</td>
<td>Remote via PC and network with Ethernet, Profibus, or Modbus RTU</td>
</tr>
</tbody>
</table>
HyPerforma S.U.M. BPCs
Open-top or closed-top Thermo Scientific™ BPC designs are available with Thermo Scientific™ CX5-14 and Aegis™ 5-14 film options.

### Standard 50 L BPC for powder-to-liquid applications without probe ports

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
<th>Tubing set (inner diameter x outer diameter x length)</th>
<th>End treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bottom drain</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.)</td>
<td>Capped 12.7 mm (1/2 in.) MPX body</td>
</tr>
<tr>
<td>2</td>
<td>Addition line</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.)</td>
<td>Plugged 12.7 mm (1/2 in.) MPX insert</td>
</tr>
<tr>
<td>3</td>
<td>Recirculation/sample line</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 137 cm (54 in.) splits to 12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 61 cm (24 in.) and 12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 30 cm (12 in.)</td>
<td>Capped 12.7 mm (1/2 in.) MPX insert Plugged 12.7 mm (1/2 in.) MPX body</td>
</tr>
<tr>
<td>4</td>
<td>Powder addition port</td>
<td>76 mm (3 in.) sanitary fitting, tri-clamp</td>
<td>Cap with gasket</td>
</tr>
</tbody>
</table>

### Standard 50 L BPC for liquid-to-liquid applications without probe ports

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
<th>Tubing set (inner diameter x outer diameter x length)</th>
<th>End treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bottom drain</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.)</td>
<td>Capped 12.7 mm (1/2 in.) MPX body</td>
</tr>
<tr>
<td>2</td>
<td>Fill line</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.)</td>
<td>38.1 mm (1 1/2 in.) tri-clamp (SterilEnz™)</td>
</tr>
<tr>
<td>3</td>
<td>Vent filter</td>
<td>6.4 mm (1/4 in.) x 12.7 mm (1/2 in.) C-Flex x 10.2 cm (4 in.)</td>
<td>Sterile hydrophobic vent filter (0.2 μm PVDF, Acro™ 50)</td>
</tr>
<tr>
<td>4</td>
<td>Recirculation/sample line</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 137 cm (54 in.) splits to 12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 61 cm (24 in.) and 12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 30 cm (12 in.)</td>
<td>Capped 12.7 mm (1/2 in.) MPX insert Plugged 12.7 mm (1/2 in.) MPX body</td>
</tr>
<tr>
<td>5</td>
<td>Addition line</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex tubing x 122 cm (48 in.)</td>
<td>Plugged 12.7 mm (1/2 in.) MPX insert</td>
</tr>
</tbody>
</table>
Standard 50 L BPC for powder-to-liquid applications with probe ports

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
<th>Tubing set (inner diameter x outer diameter x length)</th>
<th>End treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Recirculation line</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.) splits to 12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 61 cm (24 in.) and 12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 30 cm (12 in.)</td>
<td>Capped 12.7 mm (1/2 in.) MPX insert Plugged 12.7 mm (1/2 in.) MPX body</td>
</tr>
<tr>
<td>2</td>
<td>Addition line</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.)</td>
<td>Plugged 12.7 mm (1/2 in.) MPX insert</td>
</tr>
<tr>
<td>3–4</td>
<td>Probe ports (2)</td>
<td>None</td>
<td>Kleenpak™ aseptic connector KPCHT series (female)</td>
</tr>
<tr>
<td>5</td>
<td>Thermowell/ small-volume sample line</td>
<td>Thermowell adapter for 3.2 mm (1/8 in.) x 6.4 mm (1/4 in.) C-Flex x 30 cm (12 in.)</td>
<td>Luer and SmartSite™ valve port</td>
</tr>
<tr>
<td>6</td>
<td>Bottom drain</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.)</td>
<td>Capped 12.7 mm (1/2 in.) MPX body</td>
</tr>
<tr>
<td>7</td>
<td>Powder addition port</td>
<td>76 mm (3 in.) sanitary fitting, tri-clamp</td>
<td>Cap with gasket</td>
</tr>
</tbody>
</table>
Standard 50 L BPC for liquid-to-liquid applications with probe ports

<table>
<thead>
<tr>
<th>Line</th>
<th>Description</th>
<th>Tubing set (inner diameter x outer diameter x length)</th>
<th>End treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–2</td>
<td>Probe ports (2)</td>
<td>None</td>
<td>Kleenpak aseptic connector KPCHT series (female)</td>
</tr>
<tr>
<td>3</td>
<td>Thermowell/small-volume sample line</td>
<td>Thermowell adapter for 3.2 mm (1/8 in.) x 6.4 cm (1/4 in.) C-Flex x 30 cm (12 in.)</td>
<td>Luer and SmartSite valve port</td>
</tr>
<tr>
<td>4</td>
<td>Bottom drain</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.)</td>
<td>Plugged 12.7 mm (1/2 in.) MPX body</td>
</tr>
<tr>
<td>5</td>
<td>Recirculation line</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.) splits to 12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 61 cm (24 in.) and 12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 30 cm (12 in.)</td>
<td>Capped 12.7 mm (1/2 in.) MPX insert Plugged 12.7 mm (1/2 in.) MPX body</td>
</tr>
<tr>
<td>6</td>
<td>Fill line</td>
<td>12.7 mm (1/2 in.) x 19.1 mm (3/4 in.) C-Flex x 122 cm (48 in.)</td>
<td>38.1 mm (1 1/2 in.) tri-clamp (SteriEnz)</td>
</tr>
<tr>
<td>7</td>
<td>Vent filter</td>
<td>6.4 mm (1/4 in.) x 12.7 mm (1/2 in.) C-Flex x 10.2 cm (4 in.)</td>
<td>Cap with gasket</td>
</tr>
<tr>
<td>8</td>
<td>Addition line</td>
<td>9.5 mm (3/8 in.) x 15.9 mm (5/8 in.) C-Flex x 61 cm (24 in.)</td>
<td>Plugged 9.5 mm (3/8 in.) MPX insert</td>
</tr>
</tbody>
</table>

Standard open-top liner

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 L standard open-top liner, 0 probes, CX3-9 film</td>
<td>SH30762.04</td>
</tr>
</tbody>
</table>

Standard impeller sleeve

<table>
<thead>
<tr>
<th>Description</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 L impeller sleeve for open-top mixing*</td>
<td>SH30749.06</td>
</tr>
</tbody>
</table>

* The bearing hub needed for open-top mixing is automatically supplied with the tank hardware.
### Custom BPC products

<table>
<thead>
<tr>
<th>Category</th>
<th>Options/capability</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubing type</td>
<td>C-Flex™, platinum-cured silicone, PVC, PharMed™, PharmaPure™</td>
<td>More information is available in the tubing selection guide</td>
</tr>
<tr>
<td>Tubing size</td>
<td>Ranges from 3.18 mm (1/8 in.) to 25.4 mm (1 in.) inner diameter in various lengths</td>
<td>More information is available in the tubing selection guide</td>
</tr>
<tr>
<td>Connectors</td>
<td>Luer, Colder Products Company™ (CPC™) quick connects, SIP connectors, tri-clamp, Kleenpak, SmartSite, Clave™, Lynx™ steam-thru, CPC steam-thru, Gore™ steam valve, Gore™ Mini TC, BioQuate™, SterilEnz, end plug</td>
<td>More information is available in the connection system selection guide. Note: the only option for probe port connections is Kleenpak connectors</td>
</tr>
<tr>
<td>Probe ports/line addition ports</td>
<td>Ports may be added if they are compatible with the hardware</td>
<td>The reusable probe port connection uses a Kleenpak connector</td>
</tr>
<tr>
<td>Disposable sensors</td>
<td>Pressure sensor: PendoTECH™ and Finesse Solutions (PendoTECH comes standard on 500 L and 1,000 L S.U.M.); DO and pH sensor: Finesse Solutions and PreSens™; pH sensor: Mettler Toledo</td>
<td>Choice of qualified vendors available</td>
</tr>
<tr>
<td>Port sizes</td>
<td>Limited engineer-to-order customization only</td>
<td>Dependent on location in BPC and fit with hardware (e.g., 1 in. ID port on harvest line)</td>
</tr>
<tr>
<td>Rearrangement of lines on existing ports</td>
<td>Limited customization possible, such as moving sample/thermowell port to a probe tube port, or swapping exhaust outlet line with liquid lines</td>
<td>Dependent on location in BPC and fit with hardware</td>
</tr>
<tr>
<td>Dip tube lines</td>
<td>Limited customization possible</td>
<td>Length cannot interfere with impeller and shaft</td>
</tr>
<tr>
<td>Filters on media and supplement inlets</td>
<td>Limited engineer-to-order customization only. Choice of filters used to sterilize incoming media or supplements are available</td>
<td>NA</td>
</tr>
</tbody>
</table>

Note: Not all options are available for all ports. It is not possible to customize port type, port location, chamber dimensions, or mixing assembly. For additional information, please see the selection guides in the product catalog.

### BPC packaging

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer packaging</td>
<td>Supplied flat-packed with two polyethylene outer layers</td>
</tr>
<tr>
<td>Label</td>
<td>Description, product code, lot number, and expiration date on outer packaging and shipping container</td>
</tr>
<tr>
<td>Sterilization</td>
<td>Irradiation (25 to 40 kGy) inside outer packaging</td>
</tr>
<tr>
<td>Shipping container</td>
<td>Durable cardboard carton</td>
</tr>
<tr>
<td>Documentation</td>
<td>Certificate of Analysis provided with each lot for each delivery</td>
</tr>
</tbody>
</table>
## Ordering information

<table>
<thead>
<tr>
<th>50 L S.U.M. hardware</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-jacketed, DC motor, Touchscreen Console, with load cells</td>
<td>SUM0050.9001</td>
</tr>
<tr>
<td>Jacketed, DC motor, Touchscreen Console, with load cells</td>
<td>SUM0050.9002</td>
</tr>
</tbody>
</table>

Models without water jackets may have slightly different dimensions than the water-jacketed model shown in this data sheet. See the drawings provided with your unit for exact dimensions for non-jacketed models. Non-jacketed models do not have the capability to heat or cool the liquid inside the tank.

### 50 L S.U.M. BPC

<table>
<thead>
<tr>
<th>Size</th>
<th>Probe ports*</th>
<th>Film type</th>
<th>Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard powder-to-liquid BPC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 L</td>
<td>0</td>
<td>CX5-14</td>
<td>SH30768.01</td>
</tr>
<tr>
<td>50 L</td>
<td>0</td>
<td>Aegis 5-14</td>
<td>SH30973.01</td>
</tr>
<tr>
<td>Standard liquid-to-liquid BPC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 L</td>
<td>0</td>
<td>CX5-14</td>
<td>SH30767.01</td>
</tr>
<tr>
<td>50 L</td>
<td>0</td>
<td>Aegis 5-14</td>
<td>SH30983.01</td>
</tr>
<tr>
<td>Standard powder-to-liquid BPC*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 L</td>
<td>3</td>
<td>CX5-14</td>
<td>SH31055.02</td>
</tr>
<tr>
<td>50 L</td>
<td>3</td>
<td>Aegis 5-14</td>
<td>SH31051.02</td>
</tr>
<tr>
<td>Standard liquid-to-liquid BPC*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 L</td>
<td>3</td>
<td>CX5-14</td>
<td>SH31055.04</td>
</tr>
<tr>
<td>50 L</td>
<td>3</td>
<td>Aegis 5-14</td>
<td>SH31051.04</td>
</tr>
</tbody>
</table>

* All 50 L BPCs with probe ports are designed to allow probes to work properly at 5:1 turndown levels. These BPCs are only compatible with the HyPerforma hardware shown in this document. If you are using an older version of the S.U.M. hardware, do not use these items; instead refer to the legacy S.U.M. user manual or data sheets.