

## CBB's cGMP Laboratory Equipment List

### Upstream Equipment




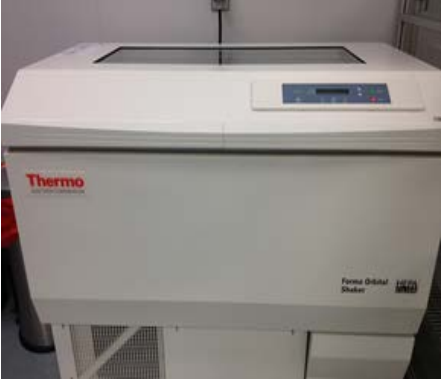

Image	Model	Typical Use/Comments
	<p>Biostat C30 DCU3</p>	<p>Small scale fermentor with working volumes from 10 to 30-L scale with most commonly requested functions and features</p>
	<p>Biostat D100 DCU3</p>	<p>Pilot scale fermentor system with working volume of 100-L, with most commonly requested functions and features</p>
	<p>Biostat D300 DCU3</p>	<p>Production-scale fermentor system with working volume of 300-L. Largest fermentor in cGMP facility with most commonly requested functions and features</p>

Image	Model	Typical Use/Comments
 <p>A white Thermo Forma Orbital Shaker 435 incubator. The device has a control panel on top with a digital display and several buttons. The Thermo logo is visible on the front left side, and 'Forma Orbital Shaker' is printed on the front right side.</p>	<p>Forma Orbital Shaker 435</p>	<p>Forma Incubator Orbital Shakers feature directed laminar airflow across the chamber, aiding temperature uniformity and contributing to a quality culture environment and with HEPA filter airflow design reduces the risk of cross contamination.</p>
 <p>A stainless steel Beta Star autoclave. The front panel features a control panel with two analog gauges, several indicator lights (red, yellow, green, blue), and a digital display. The double doors are open, revealing the interior chamber with metal shelving.</p>	<p>Beta Star N262651-DSA-HXR-GMP</p>	<p>The Beta Star unit is of GMP design, meeting the intent of the FDA GMPS (21 CFR, part 210, 211) and AAMI guidelines ISO 11134-1993. The Beta Star autoclave is a double door steam sterilizer. The double doors slide vertically and are interlocked through the controller to prevent unauthorized opening of both doors at the same time. A bioseal cross-contamination fixture is incorporated on the un-load (clean) side of the facility.</p>

**Table 2: List of Downstream Processing Equipment (Partial Listing)**






Image	Model	Equipment
	<p>Avestin Emulsiflex C160B</p>	<p>The EmulsiFlex-C160B produces a flow rate of 160L/hr/(0.7GPM), independent of the homogenizing pressure. A sample as small as 35mL can be processed with a hold back volume of less than. EmulsiFlex-C160B is capable of pressures between 500-30,000psi/33-2,000bar. Equipped with stainless steel heat exchangers to control inlet and outlet</p>
	<p>Alfa Laval LAPX 404 Disc Stack Centrifuge</p>	<p>Alfa Laval LAPX 404 offered is a high g force, high performance centrifugal clarifier designed for pilot plant, laboratory, small scale production and scale up capabilities.</p>
	<p>Sorvall Evolution RC Centrifuge with F8S 6 x 1000y rotor</p>	<p>The Thermo Scientific Fiberlite F8S 6 x 1000y rotor can separate 6-liters of sample at up to 8,500 rpm and 15,810 x g in as little as 9 minutes without using messy and time consuming canisters. With speeds of up to 26,000 rpm and RCFs up to 70,450 x g, the Sorvall Evolution RC gives you all the speed and g-force needed to handle the vast majority of current and emerging super speed applications</p>

Image	Model	Equipment
	<p>LevTech Mixing Tank LT-DBMC501</p>	<p>LevTech's Magnetic Single-use Mixer disposable bag mixing system is based on a single-use mixing bag containing a bottom mounted disposable magnetic impeller on a universal portable dolly (20L – 500Lsposable bearing</p>
 <p data-bbox="305 1220 496 1251">GE Flex Stand</p>	<p>CBB routinely uses both Hollow Fiber and Cassette TFF Systems from GE and Millipore</p>	<p>2 Millipore, Pelicon Tangential Flow Filtration, Flexstand Systems with capacity to hold UFP85 Cartridges.</p>

**Table 3: Protein Purification Systems**

Image	Model	Equipment
 <p>The image shows the GE ÄKTAexplorer, a compact protein purification system. It features a dark grey main unit with three stacked reservoirs on the left side. Two clear plastic bottles are mounted on top. On the right, there is a vertical column with a red stopcock. The GE logo and 'ÄKTAexplorer' are visible on the front panel.</p>	<p>GE ÄKTAexplorer</p>	<p>GE ÄKTAexplorer is a small scale production system, with flow rates up to 100 ml/min. CBB has two ÄKTAexplorer systems</p>
 <p>The image displays the GE ÄKTA pilot system, a benchtop-scale protein purification setup. It consists of a large black main unit with a complex network of white tubing and multiple reservoirs. A computer monitor and keyboard are connected to the system for control. The GE logo and 'ÄKTA pilot' are visible on the front.</p>	<p>GE ÄKTA pilot</p>	<p>GE ÄKTA pilot is a bench top process development and production system. The hygienic design, high level of automation, accuracy, reproducibility and reliable operation make ÄKTA pilot the perfect system for scale up, process optimization and production.</p>
 <p>The image shows the GE ÄKTA process system, a large-scale automated liquid chromatography system. It is a tall, stainless steel unit mounted on a four-wheeled cart. A laptop is connected to the side of the unit. The GE logo and 'ÄKTA process' are visible on the front panel.</p>	<p>GE ÄKTA process</p>	<p>ÄKTA process is a an automated liquid chromatography system built for process scale-up and large-scale biopharmaceutical manufacturing. ÄKTA process is the obvious choice of system to use when scaling up processes developed on smaller ÄKTAexplorer and ÄKTA pilot systems. CBB has 10mm skid with flow rates from 15 l/h to 600 l/h.</p>

**Table 4: List of Analytical Equipment (Partial Listing)**

<b>Equipment</b>	<b>Model</b>
UV-VIS Spectrophotometer	Beckman DU640
UV-VIS Spectrophotometer	Bio-Rad SmartSpec Plus
Endotoxin	Endosafe-PTS from Charles River Labs
Electrophoresis	Invitrogen SDS-PAGE and Western Blotting Equipment (iBlot Gel Transfer Device, BenchPro 4100)
TOC Analyzer	GE Sievers 900 Total Organic Carbon (TOC) Analyzer
Integrity Tester	Palltronic Flowstar IV Filter Integrity Test Instrument