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- Emulsions and Dispersions
- Cell rupture and Liposomes
- Particle size reduction to nanometers

## **Mini DeBEE –Master List**

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Date: September 28, 2015

Revised By: Chris Davey

Date: 16 Feb 2022

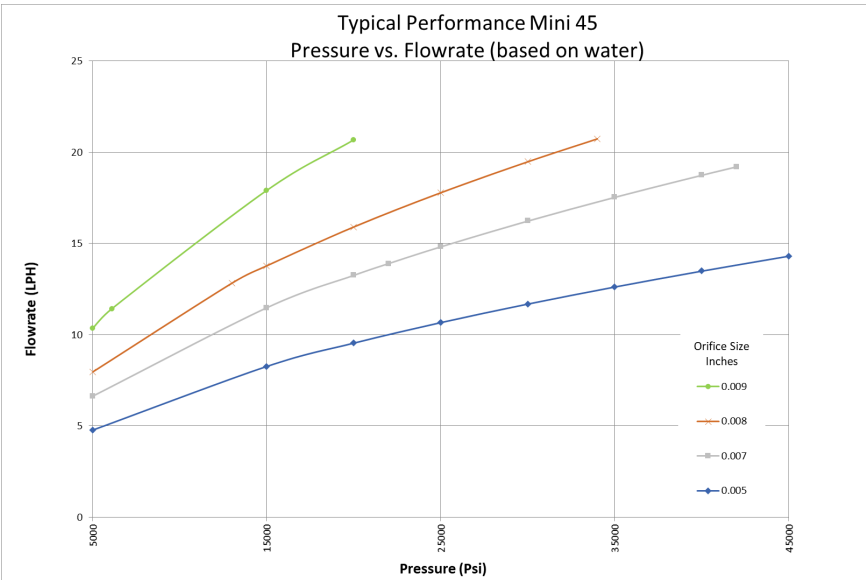
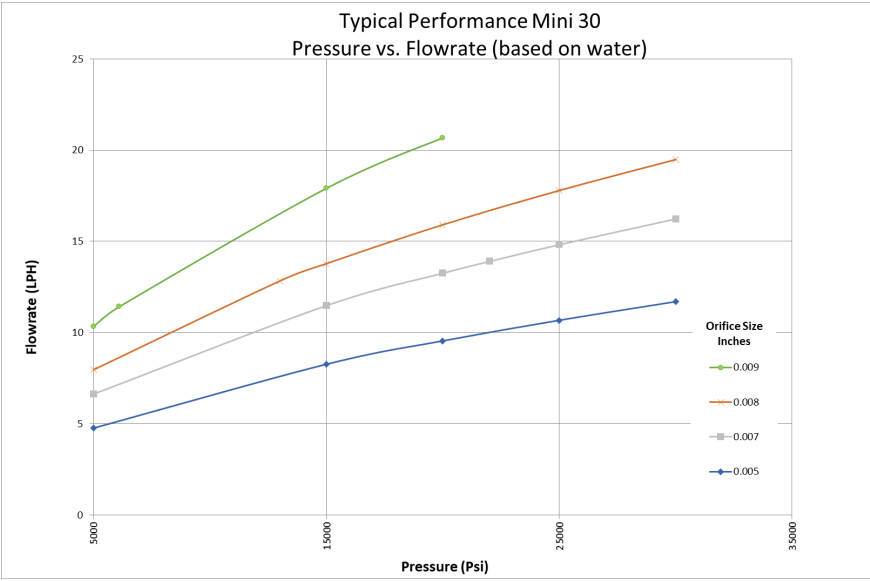
Revision No. 4.01

Name	Signature	Date
Revision to be acknowledged by:		
Tal Shechter	By email	22 Feb 2022
Bryan Colwell	By email	22 Feb 2022
Chris Davey	Chris Davey	22 Feb 2022
Jeff Desrosiers	By email	22 Feb 2022
Matt Parks	By email	22 Feb 2022
Revision to be approved by:		
Deb Shechter	By email	22 Feb 2022

## System Specifications: Mini45-220V

Mini45-220V	Mini DeBEE 45 Ultra-High Pressure Homogenizer
Operating Pressure	2,000 - 45,000 psi (150 - 3,100 bar)
Flowrate	Up to 4.0 GPH (15 LPH @ 45KPSI) Up to 5.3 GPH (20 LPH @ 30KPSI) Actual flow rate varies depending on operating parameters including operating pressure, nozzle size, and product characteristics (see attached chart)
Dimensions	54.5" x 20.5" x 29.5" H (138 x 52 x 75 cm H)
Approximate Weight	552 lb (250 kg)
Drive	Electric Motor, 5.5 hp (4 kW)
Required Power	220 V, 50/60 Hz, 3-phase, 18 A
High Pressure Pump	1 Single-acting Intensifier
Product Inlet	1 liter Stainless Steel Reservoir, 1" Tri-Clover
Product Outlet	1/4" tube
Patented Homogenizing Technology	Modular Emulsifying Cell (EC) enables adjusting process duration and flow pattern to optimize cell rupture, emulsification, dispersions and particle size reduction to nanoparticles
• Nozzle(s)	2 Zirconia or Diamond nozzle included Zirconia and diamond nozzles available in a variety of sizes
• Reactors	11 Zirconia, 1 mm diameter (+5 additional spare)
• Single Reverse Flow (SRF)	Included
• Single Parallel Flow (SPF)	Included
• Secondary EC Feed Port	Included
Homogenization Stages	2 or more
• Back Pressure Control	Variable 0 - 5,000 psi with metering valve and back pressure gauge with OPT-BPC1
Heat Exchanger	Single continuous coil to allow back pressure up to 5,000 PSI
Minimum Sample Size	100 mL, 150 mL with heat exchanger (30 mL with OPT-SV-Mini)

Performance Curves:



## Standard Features:

- Modular Emulsifying Cell (EC) configurable with multiple flow patterns for a broad range of application, including:
  - Emulsification
  - Particle Size Reduction
  - Reaction Chemistry
  - Dispersion
  - Cell Lysis
- \*All included - No need for additional purchase
- Process system configurable for continuous feed or recirculation
- Back Pressure Control with OPT-BPC1
  - Enables control of cavitation intensity in EC
  - Location downstream of the heat exchanger allows use of low boiling point fluids
  - Additional stage of homogenization
- Heat Exchanger
  - Located upstream of the back pressure valve
  - Rated for high pressure
- Benchtop process unit, portable with optional cart OPT-CT
- PLC control with digital display
  - Small volume operation from PLC
- Hydraulically driven intensifier pump with slow stroke rate provides:
  - Higher pressure capability
  - Higher process intensity
  - Lower maintenance
- Stainless steel enclosure
- Quiet operation
- Special tools and spare parts kit including:
  - Plunger seal removal and installation tools
  - Complete tool set for equipment maintenance
  - 5 spare EC reactors
  - Additional seals including: plunger seal, EC seals and check valve seals
- Robust spare parts package included
- CE compliant
- Linear scale up from R&D to manufacturing
- Over pressure protection isolated from processed product, through a hydraulic relief valve
- 2 year factory warranty (see terms and conditions)
- Easy clean up and maintenance

## Options:

Part Number	Description
<b>OPT-BPC1-Mini</b>	<b>Back Pressure Controller metering valve</b> <ul style="list-style-type: none"> <li>• Metering valve continuously variable to 5,000 PSI</li> <li>• Back pressure gauge included</li> </ul>
<b>OPT-BPC2-Mini</b>	<b>Sanitary Back Pressure Controller with a single replaceable orifice</b> <ul style="list-style-type: none"> <li>• Replaces the standard metering valve</li> </ul>
<b>OPT-BPT-Mini</b>	<b>Sanitary Back-pressure Transducer</b> <ul style="list-style-type: none"> <li>• 0 - 5,000 psi</li> <li>• Sanitary design, flow-through type</li> <li>• Digital pressure display on control panel</li> </ul>
<b>OPT-C00-Mini</b>	<b>EC5 Cleaning Nozzle Assembly</b> <ul style="list-style-type: none"> <li>• Nozzle assembly with a large orifice for maximizing flow rate and facilitating cleaning.</li> </ul>
<b>OPT-C1T-Mini</b>	<b>Portable Process Chiller 1 ton capacity</b> <ul style="list-style-type: none"> <li>• Closed loop portable chiller with internal reservoir and bypass valve</li> <li>• Capable of operating with water or glycol/water mix</li> <li>• All tubing and fittings to allow plug-in operation to standard cooling connectors provided by BEE</li> </ul>
<b>OPT-CT-Mini</b>	<b>Stainless Steel cart on casters</b> <ul style="list-style-type: none"> <li>• Custom made for the Mini DeBEE, and includes a shelf</li> </ul>
<b>OPT-DF1-Mini</b>	<b>Dual Feed Package</b> <ul style="list-style-type: none"> <li>• Manually controlled metering pump, 500 mL/min max flowrate, and tubing for material addition through secondary EC feed port</li> <li>• Sanitary design, suitable for viscous and/or suspended abrasive materials</li> <li>• Flow On/Off control synchronized via PLC</li> </ul>
<b>OPT-DF2-Mini</b>	<b>Dual Feed Internal Metering Valve (IMV) Assembly</b> <ul style="list-style-type: none"> <li>• Manually controlled metering valve with small reservoir, enabling dual-feeding into the EC</li> <li>• Suitable for both liquids and dry materials</li> <li>• Due to intermittent flow with this equipment, the IMV may not be suitable for feeding dry materials that tend to stick when wet.</li> </ul>
<b>OPT-DOC-Mini</b>	<b>IQ/OQ Documentation Package including COC's</b>
<b>OPT-ECX-Mini</b>	<b>EC extension, including 5 additional reactors</b> <ul style="list-style-type: none"> <li>• Enables extending the EC process to a total of 16 reactors</li> <li>• For products that may benefit from longer residence time or additional processing stages</li> </ul>
<b>OPT-EP-Mini</b>	<b>Electro-polish product contact parts</b>
<b>OPT-EMP-Mini</b>	<b>Electro-polish stainless product contact parts with surface finish certification</b> <ul style="list-style-type: none"> <li>• Inner surfaces on all stainless product contact fittings are polished to a maximum Ra finish of 24 micro-inch (0.6 microns)</li> </ul>

<b>OPT-FP1-Mini</b>	<b>Feed Pump Package for up to 2 LPM</b> <ul style="list-style-type: none"> <li>• Air-operated double diaphragm pump, sanitary design</li> <li>• Pump's flow rate automatically adjusts to meet the DeBEE's flow rate</li> <li>• Kit is complete and ready to use, including connection to the DeBEE and pneumatic controls</li> <li>• 1" Tri-Clamp inlet port</li> </ul>
<b>OPT-MGS-Mini</b>	<b>Molykote Glands</b> <ul style="list-style-type: none"> <li>• Dry bonded Molykote film to protect stainless threads from galling</li> <li>• Reduces spread of Molykote anti-seize compound for sanitary applications</li> </ul>
<b>OPT-NZ2-Mini</b>	<b>Upgrade 1 standard Zirconia nozzle to Diamond</b>
<b>OPT-PM-Mini</b>	<b>Preventative Maintenance program for 1 Year</b> <ul style="list-style-type: none"> <li>• One day, annual, PM service at customer site by a trained technician (Travel expenses to be billed separately at cost)</li> <li>• 10% discount on labor for additional service visits</li> <li>• 20% discount on additional parts</li> <li>• Standard verification of system performance per 25 point checklist</li> <li>• Calibrations as required</li> <li>• Maintenance and operations training as required</li> </ul>
<b>OPT-PPT-Mini</b>	<b>Sanitary Process-pressure Transducer</b> <ul style="list-style-type: none"> <li>• 0 - 60,000 psi</li> <li>• Sanitary design, flow-through product contact type</li> <li>• Replaces standard hydraulic pressure transducer</li> <li>• Digital pressure displayed on control panel</li> </ul>
<b>OPT-PRA-Mini</b>	<b>Pressurized Reservoir Assembly</b> <ul style="list-style-type: none"> <li>• For use with high viscosity products that do not flow under normal conditions</li> <li>• Includes a piston between the compressed air and the product</li> <li>• 1.5" diameter, 400 mL</li> </ul>
<b>OPT-PLG-Mini</b>	<b>Upgrade to</b> proprietary coating for use with chemically aggressive or abrasive materials <b>for one plunger on new equipment</b>
<b>OPT-Res3-Mini</b>	<b>Stainless Steel Reservoir, 1 liter, 1" Tri-Clamp, with cooling jacket</b>
<b>OPT-Res4-Mini</b>	<b>Stainless Steel Reservoir, 1 liter, 1" Tri-Clamp, air pressurize-able</b>
<b>OPT-Res5-Mini</b>	<b>Stainless Steel Reservoir, 2 liter, 1" Tri-Clamp</b>
<b>OPT-Res6-Mini</b>	<b>Stainless Steel Reservoir, 2 liter, 1" Tri-Clamp, with cooling jacket</b>
<b>OPT-Res7-Mini</b>	<b>Stainless Steel Reservoir, 2 liter, 1" Tri-Clamp, air pressurize-able</b>
<b>OPT-Res8-Mini</b>	<b>Stainless Steel Reservoir, 4 liter, 1" Tri-Clamp</b>
<b>OPT-Res9-Mini</b>	<b>Glass reservoir, 500ml, 1" Tri-Clamp</b>
<b>OPT-SHX-Mini</b>	<b>Sanitary Heat Exchanger for post processing product cooling</b>
<b>OPT-SIT1-Mini</b>	<b>Small Volume Inlet Tubing</b> <ul style="list-style-type: none"> <li>• 3/8" OD tubing instead of the standard 1" tubing</li> </ul>
<b>OPT-SIT2-Mini</b>	<b>Small Volume Inlet Tubing</b> <ul style="list-style-type: none"> <li>• 3/8" OD tubing in addition to the standard 1" tubing</li> </ul>
<b>OPT-SP2-Mini</b>	<b>Spare Parts Package Silver</b>

	<ul style="list-style-type: none"> <li>• Enhanced spare parts package for heavy usage</li> </ul>
<b>OPT-SP3-Mini</b>	<b>Spare Parts Package Gold</b> <ul style="list-style-type: none"> <li>• Premium spare parts package</li> </ul>
<b>OPT-SPV-Mini</b>	<b>Sanitary Priming Valve</b> <ul style="list-style-type: none"> <li>• Needle type (17-4 PH SS) - 316L body - UHMWPE seal</li> <li>• Replaces the standard high pressure priming valve</li> </ul>
<b>OPT-SV-Mini</b>	<b>Small Volume Package</b> <ul style="list-style-type: none"> <li>• Enables processing small samples, 30 mL Minimum</li> <li>• Includes a pressurize-able, 30 mL capacity reservoir with quick-connection for re-circulation</li> </ul>
<b>OPT-TC1-Mini</b>	<b>Thermocouple, Inlet</b> <ul style="list-style-type: none"> <li>• Integrated temperature measurement of the processed product before the EC</li> <li>• Digital display on control panel</li> </ul>
<b>OPT-TC2-Mini</b>	<b>Thermocouple, Outlet</b> <ul style="list-style-type: none"> <li>• Integrated temperature measurement of the processed product after the EC</li> <li>• Digital display on control panel</li> </ul>