

46 Eastman Street · South Easton, MA 02375 USA

**Telephone** 508-238-5558 **E-mail** sales@beei.com

**Telefax** 508-238-3860 **Internet** [www.beei.com](http://www.beei.com)

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

## **Nano DeBEE –Master List**

Prepared By: Chris Davey

Date: September 28, 2015

Revised By: Chris Davey

Date: 16 Feb 2022

Revision No. 4.01

Name	Signature	Date
Revision to be reviewed 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: Nano45-2-110V

<b>Nano45-2-110V</b>	<b>Nano DeBEE 45-2 Ultra-High Pressure Homogenizer</b> (Also available in 220 volts single-phase)
Flowrate	Up to 0.5 GPH (2 LPH) Actual flow rate varies depending on operating parameters including operating pressure, nozzle size, and product characteristics
Operating Pressure	2,000 - 45,000 PSI (150 - 3100 bar)
Dimensions, Process Unit	34" x 11.5" x 9" H (87 x 30 x 23cm H)
Dimensions, Hydraulic Power Unit	30" x 14" x 10.5" H (77 x 36 x 27cm H)
Weight, Process Unit	50 Lbs. (23 kg)
Weight, Hydraulic Power Unit	100 Lbs. (45 kg)
Drive	Electric Motor, 1 HP (0.75 kw)
Required Power	110V, 60Hz, Single Phase, 14 Amps
High Pressure Pump	1 Single-acting Intensifier
Product Inlet	100 ml Stainless Steel Reservoir, 1" Tri-Clover
Product Outlet	1/4" tube
Patented Homogenizing Technology	Modular Emulsification Cell (EC) enables adjusting process duration and flow pattern to optimize cell rupture, emulsification, dispersions and particle size reduction to nanoparticles
• Nozzle(s)	1 Zirconia or Diamond, 0.005" (0.13mm) diameter nozzle (Other sizes available)
• Reactors	6 Zirconia, 1mm diameter (+1 additional spare)
• Single Reverse Flow (SRF)	Included
• Single Parallel Flow (SPF)	Included
Homogenization Stages	2 or more
• Back Pressure Control	Optional
Heat Exchanger	Optional
Min. Sample Size	20 ml (12 ml with OPT-SV-Nano)
Pressure Instrument	Pressure gauge with isolation valve

## System Specifications: Nano45-2-220V

<b>Nano45-2-220V</b>	<b>Nano DeBEE 45-2 Ultra-High Pressure Homogenizer</b> (Also available in 110 volts single-phase)
Flowrate	Up to 0.5 GPH (2 LPH) Actual flow rate varies depending on operating parameters including operating pressure, nozzle size, and product characteristics
Operating Pressure	2,000 - 45,000 PSI (150 - 3100 bar)
Dimensions, Process Unit	34" x 11.5" x 9" H (87 x 30 x 23cm H)
Dimensions, Hydraulic Power Unit	30" x 14" x 10.5" H (77 x 36 x 27cm H)
Weight, Process Unit	50 Lbs. (23 kg)
Weight, Hydraulic Power Unit	100 Lbs. (45 kg)
Drive	Electric Motor, 1 HP (0.75 kw)
Required Power	220V, 50/60 Hz, Single Phase, 8 Amps
High Pressure Pump	1 Single-acting Intensifier
Product Inlet	100 ml Stainless Steel Reservoir, 1" Tri-Clover
Product Outlet	1/4" tube
Patented Homogenizing Technology	Modular Emulsification Cell (EC) enables adjusting process duration and flow pattern to optimize cell rupture, emulsification, dispersions and particle size reduction to nanoparticles
• Nozzle(s)	1 Zirconia or Diamond, 0.005" (0.13mm) diameter nozzle (Other sizes available)
• Reactors	6 Zirconia, 1mm diameter (+1 additional spare)
• Single Reverse Flow (SRF)	Included
• Single Parallel Flow (SPF)	Included
Homogenization Stages	2 or more
• Back Pressure Control	Optional
Heat Exchanger	Optional
Min. Sample Size	20 ml (12 ml with OPT-SV-Nano)
Pressure Instrument	Pressure gauge with isolation valve

## System Specifications: Nano30-4-110V

<b>Nano30-4-110V</b>	<b>Nano DeBEE 30-4 High Pressure Homogenizer</b> (Also available in 220 volts single-phase)
Flowrate	Up to 1.1 GPH (4 LPH) Actual flow rate varies depending on operating parameters including operating pressure, nozzle size, and product characteristics
Operating Pressure	2,000 - 30,000 psi (150 - 2,000 bar)
Dimensions, Process Unit	34" x 11.5" x 9" H (87 x 30 x 23cm H)
Dimensions, Hydraulic Power Unit	20" x 18" x 26.5" H (51 x 46 x 67 cm H)
Weight, Process Unit	50 Lbs. (23 kg)
Weight, Hydraulic Power Unit	120 lb (55 kg)
Drive	Electric Motor, 2 hp (1.5 kW)
Required Power	110 V, 60 Hz, Single-phase, 18 A Requires a 20 amp circuit with NEMA 5-20 outlet
High Pressure Pump	1 Single-acting Intensifier
Product Inlet	100 mL Stainless Steel Reservoir, 1" Tri-Clover
Product Outlet	1/4" tube
Patented Homogenizing Technology	Modular Emulsification Cell (EC) enables adjusting process duration and flow pattern to optimize cell rupture, emulsification, dispersions and particle size reduction to nanoparticles
• Nozzle(s)	1 Zirconia or Diamond, 0.005" (0.13mm) diameter nozzle (Other sizes available)
• Reactors	6 Zirconia, 1 mm diameter (+1 additional spare)
• Single Reverse Flow (SRF)	Included
• Single Parallel Flow (SPF)	Included
Homogenization Stages	2 or more
• Back Pressure Control	Optional
Heat Exchanger	Optional
Minimum Sample Size	20 mL (12 mL with OPT-SV-Nano)
Pressure Instrument	Pressure gauge with isolation valve

## System Specifications: Nano30-4-220V

<b>Nano30-4-220V</b>	<b>Nano DeBEE 30-4 High Pressure Homogenizer</b> (Also available in 110 volts single-phase)
Flowrate	Up to 1.1 GPH (4 LPH) Actual flow rate varies depending on operating parameters including operating pressure, nozzle size, and product characteristics
Operating Pressure	2,000 - 30,000 psi (150 - 2,000 bar)
Dimensions, Process Unit	34" x 11.5" x 9" H (87 x 30 x 23cm H)
Dimensions, Hydraulic Power Unit	20" x 18" x 26.5" H (51 x 46 x 67 cm H)
Weight, Process Unit	50 Lbs. (23 kg)
Weight, Hydraulic Power Unit	120 lb (55 kg)
Drive	Electric Motor, 2 hp (1.5 kW)
Required Power	220 V, 50/60 Hz, Single-phase, 8/10 A
High Pressure Pump	1 Single-acting Intensifier
Product Inlet	100 mL Stainless Steel Reservoir, 1" Tri-Clover
Product Outlet	1/4" tube
Patented Homogenizing Technology	Modular Emulsification Cell (EC) enables adjusting process duration and flow pattern to optimize cell rupture, emulsification, dispersions and particle size reduction to nanoparticles
• Nozzle(s)	1 Zirconia or Diamond, 0.005" (0.13mm) diameter nozzle (Other sizes available)
• Reactors	6 Zirconia, 1 mm diameter (+1 additional spare)
• Single Reverse Flow (SRF)	Included
• Single Parallel Flow (SPF)	Included
Homogenization Stages	2 or more
• Back Pressure Control	Optional
Heat Exchanger	Optional
Minimum Sample Size	20 mL (12 mL with OPT-SV-Nano)
Pressure Instrument	Pressure gauge with isolation valve

## System Specifications: Nano45-4-110V

<b>Nano45-4-110V</b>	<b>Nano DeBEE 45-4 Ultra-High Pressure Homogenizer</b> (Also available in 220 volts single-phase)
Flowrate	Up to 1.1 GPH (4 LPH) Actual flow rate varies depending on operating parameters including operating pressure, nozzle size, and product characteristics
Operating Pressure	2,000 - 45,000 psi (150 - 3,100 bar)
Dimensions, Process Unit	34" x 11.5" x 9" H (87 x 30 x 23cm H)
Dimensions, Hydraulic Power Unit	20" x 18" x 26.5" H (51 x 46 x 67 cm H)
Weight, Process Unit	50 Lbs. (23 kg)
Weight, Hydraulic Power Unit	120 lb (55 kg)
Drive	Electric Motor, 2 hp (1.5 kW)
Required Power	110 V, 60 Hz, Single-phase, 18 A Requires a 20-amp circuit with NEMA 5-20 outlet
High Pressure Pump	1 Single-acting Intensifier
Product Inlet	100 mL Stainless Steel Reservoir, 1" Tri-Clover
Product Outlet	1/4" tube
Patented Homogenizing Technology	Modular Emulsification Cell (EC) enables adjusting process duration and flow pattern to optimize cell rupture, emulsification, dispersions and particle size reduction to nanoparticles
• Nozzle(s)	1 Zirconia or Diamond, 0.005" (0.13 mm) diameter 1 Zirconia or Diamond, 0.008" (0.2 mm) diameter (Other sizes available)
• Reactors	6 Zirconia, 1 mm diameter (+1 additional spare)
• Single Reverse Flow (SRF)	Included
• Single Parallel Flow (SPF)	Included
Homogenization Stages	2 or more
• Back Pressure Control	Optional
Heat Exchanger	Optional
Minimum Sample Size	20 mL (12 mL with OPT-SV-Nano)
Pressure Instrument	Pressure gauge with isolation valve

## System Specifications: Nano45-4-220V

<b>Nano45-4-220V</b>	<b>Nano DeBEE 45-4 Ultra-High Pressure Homogenizer</b> (Also available in 110 volts single-phase)
Flowrate	Up to 1.1 GPH (4 LPH) Actual flow rate varies depending on operating parameters including operating pressure, nozzle size, and product characteristics
Operating Pressure	2,000 - 45,000 psi (150 - 3,100 bar)
Dimensions, Process Unit	34" x 11.5" x 9" H (87 x 30 x 23cm H)
Dimensions, Hydraulic Power Unit	20" x 18" x 26.5" H (51 x 46 x 67 cm H)
Weight, Process Unit	50 Lbs. (23 kg)
Weight, Hydraulic Power Unit	120 lb (55 kg)
Drive	Electric Motor, 2 hp (1.5 kW)
Required Power	220 V, 50/60 Hz, Single-phase, 8/10 A
High Pressure Pump	1 Single-acting Intensifier
Product Inlet	100 mL Stainless Steel Reservoir, 1" Tri-Clover
Product Outlet	1/4" tube
Patented Homogenizing Technology	Modular Emulsification Cell (EC) enables adjusting process duration and flow pattern to optimize cell rupture, emulsification, dispersions and particle size reduction to nanoparticles
• Nozzle(s)	1 Zirconia or Diamond, 0.005" (0.13 mm) diameter 1 Zirconia or Diamond, 0.008" (0.2 mm) diameter (Other sizes available)
• Reactors	6 Zirconia, 1 mm diameter (+1 additional spare)
• Single Reverse Flow (SRF)	Included
• Single Parallel Flow (SPF)	Included
Homogenization Stages	2 or more
• Back Pressure Control	Optional
Heat Exchanger	Optional
Minimum Sample Size	20 mL (12 mL with OPT-SV-Nano)
Pressure Instrument	Pressure gauge with isolation valve

## Standard Features:

- Modular Emulsifying Cell (EC) configurable with multiple flow patterns for a broad range of application, including:
  - Emulsification
  - Dispersion
  - Particle Size Reduction
  - Cell Lysis
  - Reaction Chemistry

\*All included - No need for additional purchase
- Process system configurable for continuous feed or recirculation
- Benchtop portable process unit
- Remotely located hydraulic power unit
- 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:
  - Manual piston attachment for easy priming
  - Plunger seal removal and installation tools
  - Complete tool set for equipment maintenance
  - 1 spare EC reactor
  - Additional seals including: plunger seal, EC seals and check valve seals
- CE compliant
- Linear scale up from R&D to manufacturing
- Over pressure protection isolated from processed product, through a hydraulic pressure switch and a relief valve
- 2 year factory warranty (see terms and conditions)
- Easy clean up and maintenance



**Options:**

<b>Part Number</b>	<b>Description</b>
<b>OPT-BP-Nano</b>	<b>Back Pressure controller</b> <ul style="list-style-type: none"><li>• For generating pressure down-stream of the Emulsifying Cell</li><li>• Includes a metering valve and a pressure gauge</li></ul>
<b>OPT-BP1-Nano</b>	<b>Back Pressure controller without Drain Valve</b> <ul style="list-style-type: none"><li>• For generating pressure down-stream of the Emulsifying Cell</li><li>• Includes a metering valve and a pressure gauge</li><li>• For customers that already have a drain valve installed</li></ul>
<b>OPT-BPH-Nano</b>	<b>Back Pressure controller and product cooling Heat Exchanger</b> <ul style="list-style-type: none"><li>• Combination of OPT-BP-Nano and OPT-HX-Nano</li></ul>
<b>OPT-C00-Nano</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-C4B-Nano</b>	<b>Portable Process Chiller 4,000 BTU/hr (0.33 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-DF-Nano</b>	<b>Dual Feed Package</b> <ul style="list-style-type: none"><li>• Requires separate purchase of OPT-BP-Nano or OPT-BPH-Nano</li><li>• Enables feeding extremely viscous materials directly into the emulsifying cell (EC).</li><li>• Package includes a graduated 30ml syringe, enabling precise extraction right out of the material container, and easy cleaning.</li><li>• Package includes check-valve to stop back flow from the EC into the DF syringe.</li><li>• Eliminates the need for multiple containers, and resulting loss of high value materials.</li><li>• Package includes a metering valve and pressure gauge enabling flow rate control.</li></ul>
<b>OPT-DOC-Nano</b>	<b>IQ/OQ documentation Package for Nano DeBEE</b> <ul style="list-style-type: none"><li>• This includes certificates of compliance for product contact parts</li></ul>
<b>OPT-ECX-Nano</b>	<b>EC extension, including 5 additional reactors</b> <ul style="list-style-type: none"><li>• Extends process for a total of 11 reactors</li><li>• For products that require a longer residence time within the EC</li></ul>
<b>OPT-EP-Nano</b>	<b>Electro-polish product contact parts</b>
<b>OPT-EMP-Nano</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-EW1-Nano</b>	<b>Additional 1-year extended warranty for the Nano DeBEE – Only for new machines</b>
<b>OPT-HX-Nano</b>	<b>Heat Exchanger for post processing product cooling</b>

<b>OPT-HX2 -Nano</b>	<b>Second Heat Exchanger addition to OPT-HX</b>
<b>OPT-NZ2-Nano</b>	<b>Upgrade 1 standard Zirconia nozzle to Diamond</b>
<b>OPT-Oil-Nano</b>	<b>Hydraulic oil required for the Nano (3 gallons), for USA only</b>
<b>OPT-PM-Nano</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-PRA-Nano</b>	<b>Pressurized reservoir</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-Nano</b>	Upgrade to proprietary coating for use with chemically aggressive or abrasive materials for one plunger on new equipment
<b>OPT-Res1-Nano</b>	<b>SS reservoir, 250 mL, 1" Tri-Clamp</b>
<b>OPT-Res2-Nano</b>	<b>SS reservoir, 1 liter, 1" Tri-Clamp</b>
<b>OPT-Res3-Nano</b>	<b>SS reservoir, 1 liter, 1" Tri-Clamp, with cooling jacket</b>
<b>OPT-Res4-Nano</b>	<b>SS reservoir, 1 liter, 1" Tri-Clamp, air pressurize-able</b>
<b>OPT-Res5-Nano</b>	<b>SS reservoir, 2 liter, 1" Tri-Clamp</b>
<b>OPT-Res6-Nano</b>	<b>SS reservoir, 2 liter, 1" Tri-Clamp, with cooling jacket</b>
<b>OPT-Res7-Nano</b>	<b>SS reservoir, 2 liter, 1" Tri-Clamp, air pressurize-able</b>
<b>OPT-Res8-Nano</b>	<b>Glass reservoir, 500ml, 1" Tri-Clamp</b>
<b>OPT-SP1-Nano2</b>	<b>Spare Parts Package Bronze for 2 LPH Nano</b> <ul style="list-style-type: none"> <li>• Basic spare parts package for average use</li> </ul>
<b>OPT-SP2-Nano2</b>	<b>Spare Parts Package Silver for 2 LPH Nano</b> <ul style="list-style-type: none"> <li>• Enhanced spare parts package for heavy usage</li> </ul>
<b>OPT-SP3-Nano2</b>	<b>Spare Parts Package Gold for 2 LPH Nano</b> <ul style="list-style-type: none"> <li>• Premium spare parts package</li> </ul>
<b>OPT-SP1-Nano4</b>	<b>Spare Parts Package Bronze for 4 LPH Nano</b> <ul style="list-style-type: none"> <li>• Basic spare parts package for average use</li> </ul>
<b>OPT-SP2-Nano4</b>	<b>Spare Parts Package Silver for 4 LPH Nano</b> <ul style="list-style-type: none"> <li>• Enhanced spare parts package for heavy usage</li> </ul>
<b>OPT-SP3-Nano4</b>	<b>Spare Parts Package Gold for 4 LPH Nano</b> <ul style="list-style-type: none"> <li>• Premium spare parts package</li> </ul>
<b>OPT-SV-Nano</b>	<b>Small Volume pressurized reservoir for Nano DeBEE</b> <ul style="list-style-type: none"> <li>• Enables processing small samples, 12 mL Minimum</li> <li>• Includes a pressurize-able reservoir with quick-connection for re-circulation</li> </ul>
<b>OPT-TC-Nano</b>	<b>Outlet Thermocouple installed down-stream of the EC, with external display</b>

<b>OPT-TQ1-Nano</b>	<b>Standard Torque Wrench Package</b> <ul style="list-style-type: none"> <li>• Includes a changeable head torque wrench for 100-600 in.-lbs., with 1/2", 5/8", 13/16" and 7/8" open end heads for all process connections, including the pressure gauge, priming valve and nozzle fittings</li> <li>• Includes a square drive adapter, with 3/16" hex bit socket for the HP cylinder assembly screws</li> </ul>
<b>OPT-TQ2-Nano</b>	<b>Supplemental Torque Wrench Package</b> <ul style="list-style-type: none"> <li>• Includes a changeable head torque wrench for 25-250 ft.-lbs., with 1-3/16" open end head for inlet fitting and inlet CV adapter</li> </ul>