

Operating Instructions for the EmulsiFlex[®]-B15

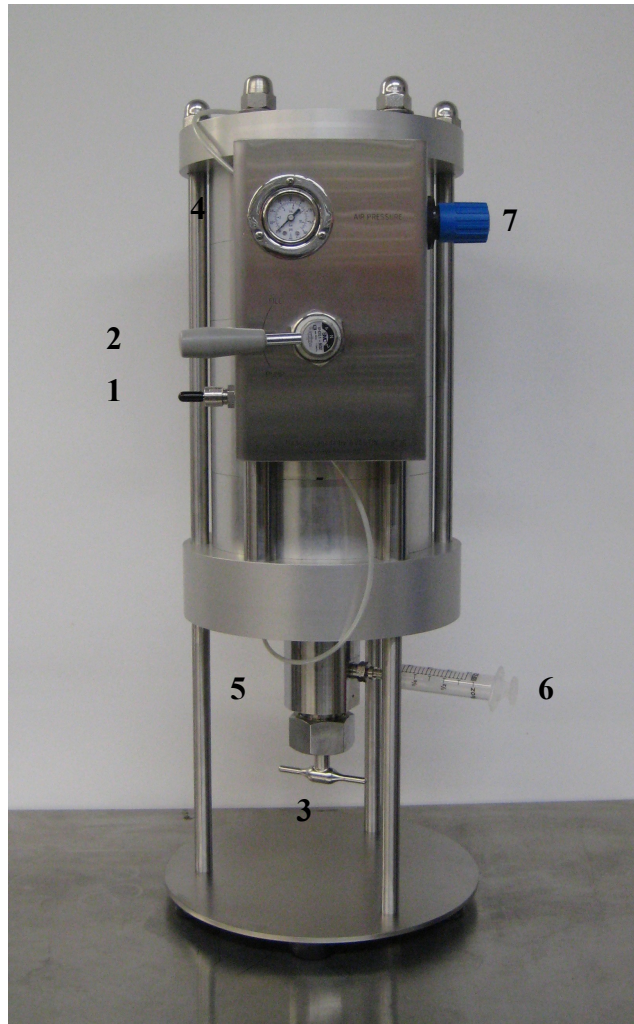


Figure 1: EmulsiFlex-B15

High Pressure Homogenizer

B15 Part List:

1	incoming air/gas hose	5	homogenizing valve
2	air control knob	6	inlet/outlet fitting and syringe
3	homogenizing valve handle	7	air pressure regulator
4	air pressure gauge		

1 WARNINGS and General Information:

1.1 Incorrect operation may lead to discharge of fluids under pressure. Users must wear eye protection at all times. Gloves and protective clothing must be worn and machine must be operated in a contained area when working with pathogenic, toxic, or corrosive materials. All necessary precautions must be taken to ensure safe operation.

1.2 Your machine may have minor physical differences from the picture on the front of this manual. These differences may be due to modifications and improvements made to the equipment over time. Differences do not alter any of the functions described below.

1.3 The regulators (Figure 1, #7 and #8) are not high pressure regulators; the incoming air/gas connection should not be attached to incoming gas with a pressure higher than 150psi/10bar. This has to be taken into consideration when using bottled gas which can have a pressure of 3000psi/207bar or more. The EmulsiFlex-B15 is fitted with a safety valve preset to release at a pressure above 150psi/10bar. This safety valve release is accompanied by a very loud noise. This release is not harmful. The valve will reset itself when you reduce the gas pressure.

1.4 Use cold tap water to learn how to operate the instrument. Experiment with various pressures. The minimum sample volume is 3mL.

1.5 Do not use excessive force when tightening any nuts on this instrument. Only tighten enough to prevent leakage. Contact AVESTIN, or their agent, directly if you have questions; please have your serial number ready.

1.6 If your EmulsiFlex-B15 was shipped in a wooden crate, please retain it. This container should be used if you need to return the instrument to AVESTIN for updating or servicing (see Section 7).

1.7 Do not attempt to disassemble the inside of the homogenizing valve (Figure 1, #5) without first consulting with AVESTIN or their agent. Please have the serial number of your instrument available.

1.8 Do not run explosive material through the EmulsiFlex-B15. Contact AVESTIN, or their agent, for further details.

1.9 Use factory supplied spare parts only. Parts from other sources, particularly high pressure parts, may result in injury and damage and will void the warranty.

1.10 Do not run the EmulsiFlex-B15 without first reading

the Operating Instructions (Section 3). Injury to personnel or machine damage could result from incorrect machine operation.

2 Requirements for operation

2.1 Compressed Air/gas:

Compressed air or bottled gas is required. A maximum pressure of 150psi/10bar is permitted. Compressed air from a compressor is suggested, but high pressure cylinders of any inert gas (air, Nitrogen, etc.) may be used. Make sure correct regulators are fitted to any high pressure gas cylinders.

3 Operating instructions

3.1 Before starting:

3.1.1 Connect the cut end of the blue, incoming air/gas hose to an air compressor or gas cylinder. With the control valve in the “OFF” position, push the quickconnect fitting on the other end of the blue hose (Figure 1, #1) onto the AIR IN fitting on the side of the B15 control panel.

3.1.2 Ensure that the EmulsiFlex-B15 is kept on a flat, level surface.

3.1.3 Rinse the EmulsiFlex-B15 with buffer before use to clear the chamber of any residual cleaning solution. See Section 4.

3.2 Running:

3.2.1 With the control knob in the “OFF” position, set the air pressure for the desired homogenizing pressure.

$$\text{Air Pressure} = \frac{\text{Homogenizing Pressure}}{300}$$

The following chart shows the homogenizing pressure resulting from the air pressure set by the user.

Air Pressure psi/bar	Homogenizing Pressure psi/bar
40/3	12000/825
60/4	18000/1250
80/5.5	24000/1650
100/7	30000/2070
120/8.5	36000/2480
140/9.5	42000/2900
150/10	45000/3100

3.2.2 Move the control knob to “PUMP” position. When there is no more air noise, screw a syringe loaded with 3 to 15mL of sample onto the inlet/outlet fitting.

3.2.3 Move the control knob to “FILL”.

3.2.4 As soon as the syringe is empty, move the control knob to “OFF”.

3.2.5 Tighten the homogenizing valve knob. This closes the homogenizing valve to prevent sample from being processed at a lower than desired pressure.

3.2.6 Move the control knob to the “PUMP” position.

3.2.7 SLOWLY loosen the homogenizing valve knob until fluid can be seen filling the syringe. Continue to loosen the knob to maintain a SLOW, even sample flow into the syringe. The sample is being homogenized.

3.2.8 To cool the sample, place the stainless steel beaker provided into an ice water bath and empty the syringe into the beaker immediately after homogenization.

3.2.9 Draw the processed sample from the stainless steel beaker into the syringe. Return to step 3.2.2 to do further passes.

4 Cleaning the EmulsiFlex-B15

4.1 Move the knob to the “PUMP” position. Attach a syringe containing a cleaning solution to the inlet/outlet fitting (Figure 1, #6).

4.2 Move the control knob to “FILL” position to draw cleaning solution into the pump and back to “PUMP” to expel. Repeat several times, changing the cleaning solution occasionally.

5 Troubleshooting

5.1 Releasing valve pressure too early:

5.1.1 Check the volume in the syringe before tightening the homogenizing valve knob, noting that there will always be 1mL left in the pump. If there is still sample inside the instrument, loosen the knob until the sample is slowly filling the syringe.

5.2 The sample starts filling the syringe as soon as the control knob is switched to “PUMP”:

5.2.1 The seat and stem inside the homogenizing valve are worn. Tighten the homogenizing valve knob in order

to close the valve. Contact AVESTIN, or their agent, for further information.

5.3 There is leakage of product from a high pressure fitting:

5.3.1 Stop the homogenizer and tighten the fitting nut with an appropriate tool until snug. Do not over tighten.

5.3.2 If leaking persists, stop the homogenizer and ensure the sample is not under pressure. Undo the leaking fitting and inspect the metal seal faces for dirt or damage (scratches, etc.). If damage is visible, a replacement part might have to be ordered.

5.4 Excessive foaming of product:

5.4.1 Use degassed buffer solution.

5.4.2 Check the inlet/feed assembly for leaks. Tighten all fittings until snug. Do not over tighten.

www.avestin.com

AVESTIN, Inc.

2450 Don Reid Drive, Ottawa, ON, Canada, K1H 1E1, e-mail: avestin@avestin.com, website: www.avestin.com

Tel: -613-736-0019, Fax: -613-736-8086, US & CDN customers call toll free: 1-888-AVESTIN (283-7846)

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5.4.3 To remove all the air from the B15 chamber, perform the following after step 3.2.4:

When the air noise has stopped, move the control knob to the “PUMP” position. The syringe will fill with a volume that is equal to the original volume. Part of this may be made up of some air that was in the B15 chamber at the beginning of the process. Remove the syringe from the inlet/outlet fitting and remove the air from the syringe. Attach the syringe to the inlet/outlet fitting and go back to step 3.2.3. There is now no air in the B15.

6 Scaling Up, Scaling Down

6.1 Scaling Up:

AVESTIN manufactures standard and custom made EmulsiFlex homogenizers up to 1000L/h continuous flow at pressures up to 30000psi/2070bar. Contact AVESTIN, or their agent, directly concerning larger homogenizing equipment.

6.1.1 EmulsiFlex-C5:

The EmulsiFlex-C5 is capable of processing at rates between 1 and 5L/hr depending on the homogenizing pressure (up to 30000psi/2070bar). It is powered by compressed air/gas alone. The entire unit can be autoclaved and immersed in a temperature controlled water bath.

6.1.2 EmulsiFlex-C3:

The EmulsiFlex-C3 is an electric motor driven high pressure homogenizer. It is capable of reaching homogenizing pressures up to 30000psi/2070bar and processes material at a rate of 3L/hr, independent of the homogenizing pressure.

6.2 Scaling Down:

Smaller than the EmulsiFlex-B15 is the EmulsiFlex-B3. The LiposoFast line of extruders is available for the preparation liposomes/emulsions in small volumes from 0.1 to 50mL. Extrusion is through polycarbonate membranes of defined pore sizes. Please contact AVESTIN, or their agent, for more information on the LiposoFast line of extruders.

6.2.1 EmulsiFlex-B3:

A batch homogenizer for volumes from 1mL to 3.5mL. This air-powered machine is capable of pressures up to 30000psi/2070bar (not shown in Figure 2).



Figure 2: Standard EmulsiFlex homogenizers. Custom models are available upon request. Call AVESTIN for details.

7 Shipping

All EmulsiFlex homogenizers are shipped in high quality, wood crates. KEEP THIS CRATE as it is the best way to store/transport your homogenizer.

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AVESTIN, Inc.

2450 Don Reid Drive, Ottawa, ON, Canada, K1H 1E1, e-mail: avestin@avestin.com, website: www.avestin.com

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