

## Using a Pressure Gauge to Assess Breast Pump Performance

Breast pump effectiveness is evaluated by measuring the *vacuum* (also called *suction*) of the pump with a pressure gauge, an instrument that measures negative pressure. The gauge needle points to a number from 0 to 450 *mmHg* (the abbreviation for *millimeters of mercury – Hg* is the chemical symbol for mercury). The reading on the gauge is then compared to a standard range for the specific breast pump that is being tested, to determine whether the pump is performing adequately or not.



### Testing WIC Pumps

The gauge will primarily be used to obtain pressure readings on **Lactina** breast pumps.

- **Test Lactinas for vacuum level each time they are cleaned between users, using the instructions below.**

**Pump in Styles** will only need to be tested if a participant reports a problem with a pump. The participant also has the option to call Medela's Customer Service directly for troubleshooting.




**Please Note:** The gauge measures the *vacuum*, not the *speed*, of the pump. When there are questions about a pump's performance, the concern is usually about the vacuum, but not always. If it does appear to be a question of *speed*, turn the pump on and count the number of cycles for a minute. The normal range for a Lactina breast pump is 40-60 cycles per minute and for the Pump in Style about 60 cycles per minute.

### Prior to testing pump performance:

1. Set aside one double pumping accessory kit to be dedicated to pump testing.
2. Ensure that the pump to be tested is assembled correctly. For an electric breast pump (Lactina or Pump in Style), **attach tubing for single pumping** (pumping just one breast)
3. Inspect all of the parts to the pump – the flange (sometimes called a breastshield), membrane, and valve. Even a small tear in the membrane can affect pump performance.
4. Securely attach a single bottle and all of the pump parts to the tubing.
5. Firmly press the plug into the second opening for the tubing (needed when double pumping) and ensure that the opening is completely closed.
6. Turn the pump on and listen for any irregularities. Many Lactina's that have suction issues also make unusual squeaks or noises, or they just sound louder than usual.

## Instructions for using the pressure gauge:

*Please Note: The pressure gauge is **very fragile** and needs to be handled with care. Dropping a gauge can result in an incorrect reading. Prevent them from being banged on counters.*

1. If not already attached, insert the vacuum gauge into the hole in the rubber stopper.
 
2. The pull-tab on the rubber stopper should be in the back of the gauge.
 
3. Insert the rubber stopper containing the gauge firmly into the **24mm** flange (fits correctly only in the 24 mm flange). Ensure a complete seal by firmly pressing in all edges of the rubber stopper.
 
4. Set the pump's vacuum regulator dial to the minimum/low setting.
  - **Lactina** – this is located on the pale yellow arm of the pump (Minimum suction is achieved by setting the pointer on the regulator ring to MIN. For maximum suction, set the pointer to MAX.)
  - **Pump in Style** – the vacuum regulator dial is on the faceplate of the pump (labeled low, medium, and high)
5. Turn on the pump and look at the gauge to read what the value is on MIN/low. Record this value.
6. Gradually increase the suction level on the vacuum regulator dial and watch the gauge to see if the pressure values increase in response. Continue to adjust the suction level on the pump until it is on the MAX/high setting. Record this value.
7. Testing the other side of the pump –
  - **Lactina:** If the Lactina functions well on the first side, the pump is sound, and there is no need to check the other side.
  - **Pump in Style:** Test both sides. Unfasten the tubing and plug and switch sides. Repeat the process above and record values on the MIN/low and MAX/high settings.



8. Compare the values you obtained with the standard values listed below.

- **Symphony**                      50 – 250 mmHg
- **Lactina**
  - MIN setting    90 – 100 mmHg
  - MAX setting   240 – 250 mmHg

(Values should go up as dial is adjusted from MIN to MAX)
- **Pump in Style**
  - First phase                      50 – 200 mmHg
  - Second phase                  100 – 250 mmHg
  - Low setting        90 – 100 mmHg
  - High setting        240 – 250 mmHg

***Please Note:** Vacuum levels can vary based on **weather** (so do not test pumps during stormy conditions! ☺) and **elevation**. To learn the elevation of your clinic, try googling “Elevation of (your town) Oregon” or use the link below to find your location on the Oregon map, and then scroll down to estimate your elevation on the second map:*

[http://www.netstate.com/states/geography/mapcom/or\\_mapscom.htm](http://www.netstate.com/states/geography/mapcom/or_mapscom.htm)

*The values listed for the MAX/High setting in #8 above are accurate if the elevation of your clinic is from sea level-1650 feet above sea level. For elevations above 1650 feet, see the chart below to see the values for the MAX/High setting. You will notice that the higher the elevation, the lower the normal values.*

- |                                      |          |                  |
|--------------------------------------|----------|------------------|
| • Sea level to 1650 ft (500 meters)  | 255 mmHg | (235 – 275 mmHg) |
| • 1650 to 3300 ft (500-1000 meters)  | 240 mmHg | (220 – 260 mmHg) |
| • 3300 to 6600 ft (1000-2000 meters) | 225 mmHg | (205 – 245 mmHg) |
| • Above 6600 ft (2000 meters)        | 199 mmHg | (179 – 219 mmHg) |

*Please contact the State Breast Pump Coordinator if you have any questions about your elevation and the correct pressure values to use.*

9. The pressure gauge does not need to be removed from the flange for storage. In fact it is best if the gauge is not removed every time a pump is tested, because the gauges are very delicate. If the pressure gauge does need to be removed from the flange for some reason, grasp the gauge and stopper tab and carefully pull the unit out, and store it in a safe place.

**Pump not working properly**

- If a **Lactina** is not able to maintain proper pressures, remove it from service and dispose of it on-site. Contact the Breast Pump Coordinator if a replacement pump is needed.
- For **Pump in Styles** that are not working properly, contact the Breast Pump Coordinator.
- Although manual pumps can be tested, Medela no longer provides information on optimal pressure ranges for the manual two-handed pump or the one-handed Harmony pump. If a manual pump is not working properly, contact the Breast Pump Coordinator.

Contact information for the State Breast Pump Coordinator:

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