TECH REPORT

204:

Converting Sample Pressures to Forces

The actual pressure applied to a sample in the well of a BioPress™ compression plate is dependent on the surface area of the sample to which the force is being applied. Therefore, the FX-5000™ Compression System is designed to apply a force to three dimensional samples so that force is not dependent on sample size.

The FX-5000™ Compression System has a conversion calculator built into the software for converting pressure (kPa) to force (lbs), and vice versa. To access this calculator, select **Calculate** from the **Regimens** menu. Select the **Convert Pressure to Force** or **Convert Force to Pressure** calculator by clicking on the appropriate button beside the calculator label. For pressure to force conversions, enter the pressure in kPa in the **Pressure (kPa)** box and the sample diameter in millimeters in the **Sample Diameter (mm)** box. Click **Calculate**. The calculated force in lbs will appear in the **Force (lbs)** box.

For force to pressure conversions, enter the force in lbs in the **Force (lbs)** box and the sample diameter in millimeters in the **Sample Diameter (mm)** box. Click **Calculate**. The calculated pressure in kPA will appear in the **Pressure (kPa) box**.

Alternatively, you can use the equation below to convert your desired pressure to a force. Simply plug the pressure that you wish to apply to your sample into the equation below, along with your sample diameter, and program the resulting force into the FlexSoft® software.

$$Force_{lbs} = 0.177*(P_{MPa})*(D_{mm}^2)$$

where $Force_{lbs}$ is the force applied to a single sample or cell in pounds, P_{MPa} is the pressure that you wish to apply to the sample in megapascals (MPa), and D_{mm} is the diameter of a single sample in mm.

If you wish to determine the pressure applied to your samples given the force programmed into the software, you can use the following equation:

$$P_{MPa} = (5.65* Force_{lbs})/(D_{mm}^2)$$

where P_{MPa} is the pressure applied to the sample in megapascals (MPa), $Force_{lbs}$ is the force entered into the regimen or displayed on the software screen in pounds, and D_{mm} is the diameter of a single sample in mm.