Weld Force can be applied two ways, Direct or Indirect

**Direct:**
Usually on a Press-Type Spot Welder or Seam Welder where the Weld Cylinder is directly above the Upper Electrode, Weld Wheel, or Tooling. Calculating the Area of the Piston or Diaphragm, multiplying the result by the Regulated Pressure at the Weld Cylinder, and adding the weight hanging from the Ram equates to the applied Welding Force.

The formula for calculating the Weld Force at the Electrodes is:

![Diagram of Welding Equipment]

1. **1st Calculate Piston Area**
   
   \[ A = \frac{d^2 \times \pi}{4} \]

   **Where:**
   
   \( A = \) Piston Area
   \( d = \) Cylinder Bore Dia.
   \( \pi = 3.14 \)

2. **2nd Calculate Weld Force**
   
   \[ WF = \text{PSI} \times A + \text{HW} \]

   **Where:**
   
   \( WF = \) Weld Force
   \( \text{PSI} = \) Regulated Pressure
   \( A = \) Piston Area
   \( \text{HW} = \) Head Weight (Mass Below Ram)
Indirect: Usually on a Rocker Arm Spot Welder where the Weld Cylinder is not directly in-line with the Upper Electrode or Tooling.

The formula for calculating the Weld Force at the Electrodes is:

\[
WF = \frac{PSI \times A \times B}{C}
\]

Where:
- \( WF \) = Weld Force
- \( PSI \) = Regulated Pressure
- \( A \) = Piston Area
- \( B \) = Pivot to Cylinder Dim.
- \( C \) = Pivot to Electrode Dim.

\[
A = \frac{d^2 \times \pi}{4}
\]

Where:
- \( A \) = Piston Area
- \( d \) = Cylinder Bore Dia.
- \( \pi \approx 3.14 \)