Introduction to the Hydraulic Press and Die Forming Terminology

The Press

Ram: a bottle jack, used with a manual or electric pump to apply pressure to your die

Platens: the steel blocks mounted within the press frame which hold your work (die & metal) while it is being press formed

Frame: the steel scaffold which hold the springs, plattens, and ram and which should always be bolted down to your work surface

Spacer: Spacers take up excess space in the work area to reduce the travel distance required for the platens to begin applying pressure to the workpiece.

Riser Block: a steel block specifically designed for use with the bonny doon that acts like a spacer to increase the height of your work surface (metal and die)

Electric Pump: the hydraulic electric mechanism that uses oil which is pumped into the resevoir of the ram to raise the piston and press the work

Silhouette Die Forming (aka matrix die forming): A technique using an hydraulic press to force non ferrous metal through an opening in a rigid solid surface (such as acrylic, tool steel, aluminum). This is the simplest type of forming, good for large and small production runs

Poly-Urethanes:

Specially formulated rubber-like material for metal forming - acts like a liquid b/c it is incompressible, it retains a constant volume. Forces are transmitted equally though it like a fluid. When it is placed under pressure, it changes its shape but maintains its volume.

60 Durometer - (cream color), softest, creates most volume
95 Durometer (red), hardest, gives the most detail

60 Durometer

- This will form the metal more deeply / move more metal than harder, esp in contained system
- This will leave a rounded edge rather than a crisp edge

95 Durometer

- This is used for shallow detail (Embossing, coining) and for achieving crisp edges in your silhouette forms

Urethane should be at least twice as thick as the depth you are pushing into (unless using intensifiers)

Flange:

- This is the left-over (selvage) metal around the form that's been pressed. The goal is to have some flange metal move into the die which decreases the amount of thinning of the stretched metal.
- Too much flange may be an expensive waste of material.
- Too little flange and the metal may draw into the die completely

Intensifiers:

These are small pieces of urethane that can be used in specific areas to focus pressure, esp for corners or narrow areas that resist forming

Variables!

- The heavier the metal formed, the greater the pressure needed
- The smaller the dimensions of the die opening the greater the pressure required to form the metal
- The flow of metal will be different in diff areas of the die depending on its shape and size
- Dies with sharp edges can tear very thin metal
- All of these determine your decision-making:
    - Gauge and type of metal
    - Die opening size and shape
    - Type of urethane used
    - Size of flange available from which to draw metal

Tips:

- Use burr life between die / metal and metal / urethane, just a small drop to reduce friction and resistance
- Always Center your work between the platens
- Scribe centering lines on your die
- Do Not overextend the ram
- Use safety glasses and stand in front of the frame, not on the open face of the press
- Create your prototype and save it with notes re gauge / type of metal used, number of presses, the strength of each press, surface pattern and any other notes which enable you to recreate or modify the piece in future
- Sign / date finished work for sale