READY
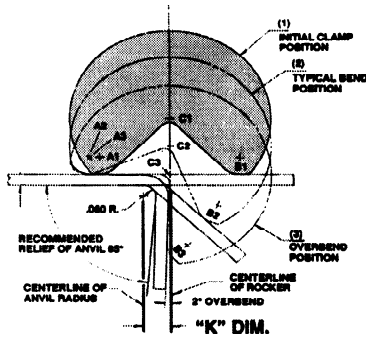
Bender Location and Design Formulas:

Bender Location ... "K" Dim.

The formula for the "K" dimension of a 87° standard rocker is:

Formula for 'A' = 87°, rocker
$$K = \frac{PT+PR}{\tan(A/2)}$$

1. Bender location ... *CAD compatible "K" Dimension*

The "K" Dimension is the distance between the centerline of the anvil radius and the centerline of a fully closed rocker. Its purpose is to aid the designer in dimensioning the key slots needed to locate the READY Bender® easily.

When the toolmaker actually sets the READY Bender®, he is in fact setting to the "K" Dimension. Correct setting of the bender will provide for longer tool life and better parts.

The "K" Dimension changes as an overbend is added to or subtracted from the bending lobe. Though the centerline of the rocker is constant, it will move closer to or further from the anvil radius.

These formulas are only valid for square 90° bend angles. For overbends up to 120° or underbends down to 60°, please consult READY. Due to the trigonometric variations, the formulas are completely changed and can not be generalized.

Angle A: 87° Standard

$$K = \frac{PR+PT}{\tan A/2}$$
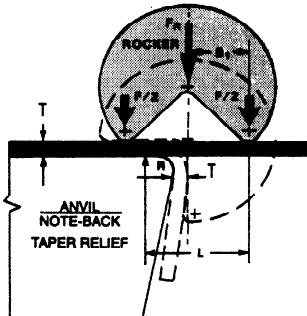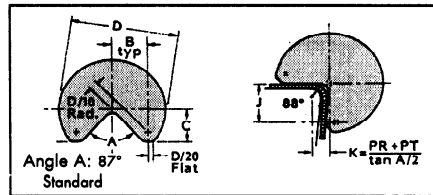
(Clamp position shown solid, overbend position dotted)

Benders require 50-80% less tonnage than wipe tools.

2. Tonnage Formula for READY Benders®

READY Benders® require 50-80% less tonnage than wipe bending tools. The clamping lobe provides part holddown from first contact, the bending lobe has greater bending leverage. The ability to overbend up to 120° eliminates the need for coining and bottoming.

F = force required
S = nominal ultimate tensile strength
W = width of bend
T = stock thickness
L = span (as a beam) L=B+R+T
B = designer dimension of 1" dia. rocker
R = anvil radius

Example:

$$F = 2.25 \times \frac{SWT^2}{L} \; ; \; L = B_1 + T + R = 0.343 + 0.060 + 0.060 = 0.463$$
(1" DIAMETER ROCKER)

$$F = \frac{2.25 \times 50,000 \times 1" \times 0.060^2}{0.463} = 875 \text{ lb.} = \underline{0.44 \text{ ton}}$$

Bend Allowance

3. General Bend Allowance Formula

READY Benders® overbend to allow for springback instead of coining the part material to "set" the bend. As a result, benders leave more material within the bend radius so the bend allowance is *greater* than wipe bending.

Caution. As we all know, bend allowance may change with different materials and even within different coils of the same material. The only way to be sure of the bend allowance is to test bend the material and measure the BA.
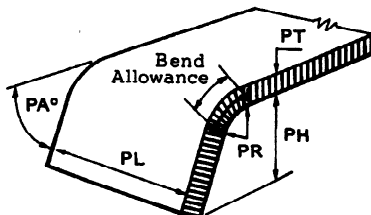
The general formula is:

Bend Allowance (BA) = .01745 x PA x [PR + (PT x .43)]