When the material is changed to M2, this increases to approximately 150,000 shots or more in SPCC of thickness 2 mm with an M2 punch. The following is the formula for calculating the minimum punching diameter.

- Fatigue strength of tool steel: $d_{min} = \frac{a}{4} \sqrt{\pi} \frac{a}{107}$

For example, when punching 100,000 shots or more in SPCC of thickness 2 mm with an M2 punch, the minimum punching diameter is calculated as follows:

- $d_{min} = \frac{a}{4} \sqrt{\pi} \frac{a}{107}$

Example 3: The minimum punching diameter that is possible when punching 100,000 shots or more in SPCC of thickness 2 mm with an M2 punch is the following.

- $d_{min} = \frac{a}{4} \sqrt{\pi} \frac{a}{107}$

Example 4: Calculate the full length of the punch which will not produce buckling when a 4.8 hole is punched in stainless steel 304 (sheet thickness 1 mm, tensile strength $o = 450 \text{ kgf/mm}^2$, with a straight punch (D2).

- $P_o = a \times \frac{E}{s} \times \frac{d}{6}$

From Formula 5:

- $P_o = a \times \frac{E}{s} \times \frac{d}{6}$

If the safety factor is 3, then

- $\ell = 2623 = 87 \text{ mm}$

If the punch plate sheet thickness $t$ is 20 mm, then buckling can be prevented by using a punch of total length 107 mm or less. For a punch based on the stripper plate (punch plate tip is guided by the clearance), the full length should be 87 mm or less.

Example 5: The buckling load $P$ when a SHALS 60 → P2.00 → BC20 punch is used without a stripper guide is the following.

- $P = \frac{a \times E}{s} \times \frac{d}{6}$

If the safety factor is 3, then

- $P = 420/3 = 142 \text{ kgf}$

Without a stripper guide, $\ell = 87 \text{ mm}$.