



# EVALUATING PRESS BRAKE TOOLING QUALITY

Tooling is an important aspect of getting the best out of your press brake machine.

Weak or badly designed tooling can add costs onto your project, for this reason we would like to offer you the following considerations.

1. **Tool strength:** Tools must be able to withstand stresses from high tonnage without deforming their profile; however the tool steel needs to maintain some limited elasticity to avoid, with tools being "too stiff", the risk of breakage due to any accidental overload, which may cause operator injury.

**Rolleri solution:** All our tooling has been designed to offer the best relationship between their cost and their functionality, looking to find the best tuning among the three main characteristics that affect the final strength of any tool:

- The shape of the tool: tools produced with "straight" section only receive a uniform force oriented along the vertical axis (compression). More complex tools, such as gooseneck/swanneck, go through a torque too, and for this reason the tool body will be less resistant.
- The size of the tool section: each kind of steel used to produce tools has its own structural resistance, shown in N/mm<sup>2</sup> and in HRC on the table below. It is worth remembering that, even though the tool body has the same strength, smaller sections (less mm<sup>2</sup>) will be more susceptible than larger ones.
- The kind of steel used: once we've determined the shape and the section of the tool, we choose the best suitable between two types of tool steel. Both are supplied to the highest standard that conform to the International Rules. The two types of steel has chemical compositions, mechanical features and different prices (see table).

Kind of steel chosen	Steel tensile strength (the same as the tool body)	Steel hardness (the same as the tool body)	Hardness achievable on tool working surfaces after hardening process
42CrMo4	900 - 1150 N/mm <sup>2</sup>	29,1 - 36,9 HRC	54 - 60 HRC
C45	560 - 710 N/mm <sup>2</sup>	12 - 15,5 HRC	54 - 60 HRC
1.2842 (total hardened)	2100 - 2200 N/mm <sup>2</sup>	58 - 60 HRC	—

2. **Pressure and wear resistance on working areas:** The full bending power is concentrated on these little areas that have also to withstand the wearing action due to the sheet sliding over them.

**Rolleri solution:** We harden the tools working areas to 54-60 HRC, penetrating 3 mm into the tool body. This process is carried out by electromagnetic induction hardening because through our experience we have discovered it to be the best in relation to quality/reliability and to price.

There are some alternative solutions to the induction hardening:

- Total (or through) hardening: it will increase the tool body tensile strength, but the resulting hardness is lower than 50 HRC. This result is interesting concerning the tool body strength, however it does not increase the work areas hardness to more than 50 HRC (C45-42CrMo4).
- Coating: increase the tool surface hardness but it doesn't penetrate under the tool surface. If the steel below the tiny coating is too mild, the working areas could be compressed or deformed by the heavy load on small surfaces.
- Laser hardening: offers comparable hardness as induction hardening, but at higher costs.

3. **Dimensional tolerance:** tooling with low tolerances can determine poor quality applications, such as bending or overlapping marks.

**Rolleri solution:** Our quality's system and our use of the most modern C.N.C. machines by qualified operators, let us offer the warranty to respect tolerances included in +/- 0,01 mm on all the critical dimensions.

4. **Versatility:** It depends by the dimensions, the shape and the resistance of any tool.

It increases as the spectrum of the obtainable products become wider, because it helps to lower the needing of tool exchange operations: activity that requires loss of time, so increases the production costs.

**Rolleri solution:** Our full, pre and after sales, service care, where our customer can seek our free advice through our experience in design and manufacture tools.