

# Type FA Deep Rolling Tools Application: Large thread root radii

For deep rolling dynamically loaded parts, such as the large external threads as used in the oil industry, to increase fatigue strength

The deep rolling process significantly increases the amount of load cycles a component can endure without fracturing. The fatigue strength is dramatically improved. Only deep rolling combines the following three advantageous physical effects:

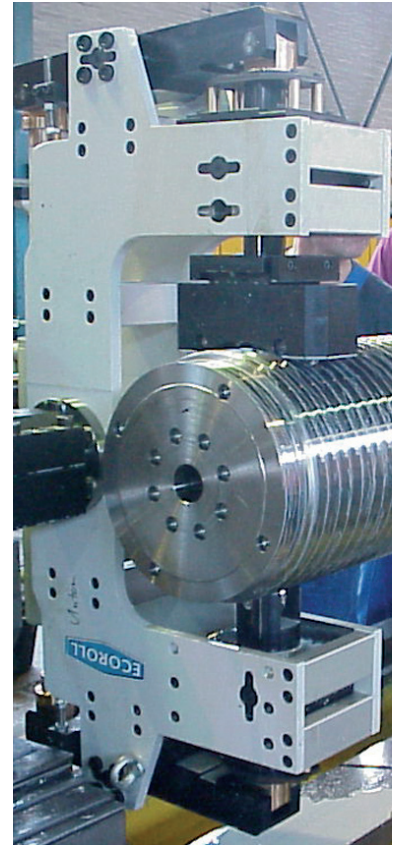
## Deep rolling

- smoothes the surface (prevents micro-notches and cracking),
- generates cold work hardening (increases material strength)
- and induces compressive residual stresses in the surface edge layer.

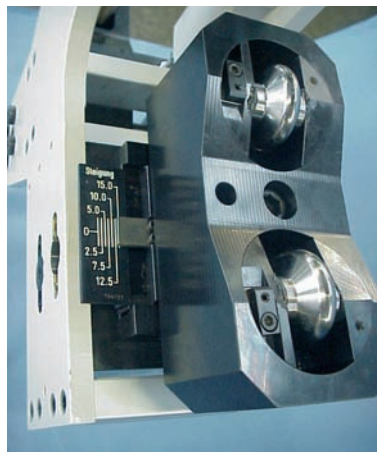
## Features

Under normal operating conditions, the highest tension is concentrated in the thread root. The deep rolling process focuses on the thread root radius.

- Even conical threads can be processed with the tool's automatic adjustment mechanism.
- FA tools are designed to be applied with CNC-controlled lathes.
- No deep rolling force is transferred from an FA tool to the machine tool. The C-bracket form allows the tool to accommodate all of the forces.
- Deep rolling forces up to 60 kN are possible.
- Deep rolling is suitable for metals with tensile strength up to 1400 N/mm<sup>2</sup> or a yield strength up to 1200 N/mm<sup>2</sup>.
- An hydraulic cylinder transfers the deep rolling force to the tool. An external hydraulic unit is activated to build up pressure in the hydraulic cylinder. The hydraulic pressure and thus the deep rolling force remain constant and can compensate for workpiece tolerances and machine positioning errors.
- The FA tool rollers are positioned at an offset relative to the thread and are seated such that they can move freely. During the application, the rollers are always properly positioned in the thread root without sideways tension.



Applying the FA deep rolling tool



Roller position



FA deep rolling tool