

2. Control and monitoring of rolling force

The reliable reproduction of the rolling force is the most important prerequisite for constant product quality (see also section 0). ECOROLL deep rolling tools are designed in a so that the rolling force can be monitored and controlled during the process. This takes place with hydrostatic tools through control of the pressure. With me-

Mechanical tools:

- pre-load springs by in-feed
- programmed repetition = equal results
- monitor spring deflection
- dial gage or inductive sensor
- record or warning signal

Hydrostatic tools:

- pressure setting determines force
- monitor pressure
- pressure gage or transducer
- record or warning signal

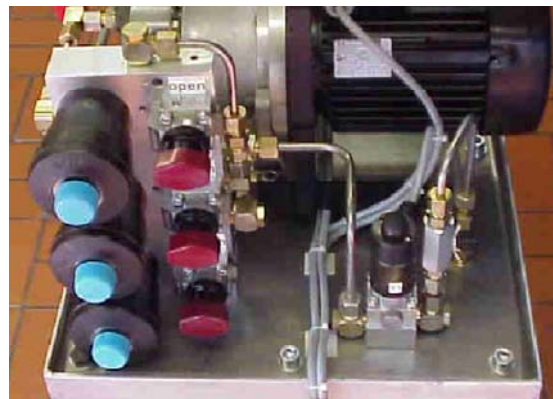


Fig.2-1 : Control and monitoring of rolling force

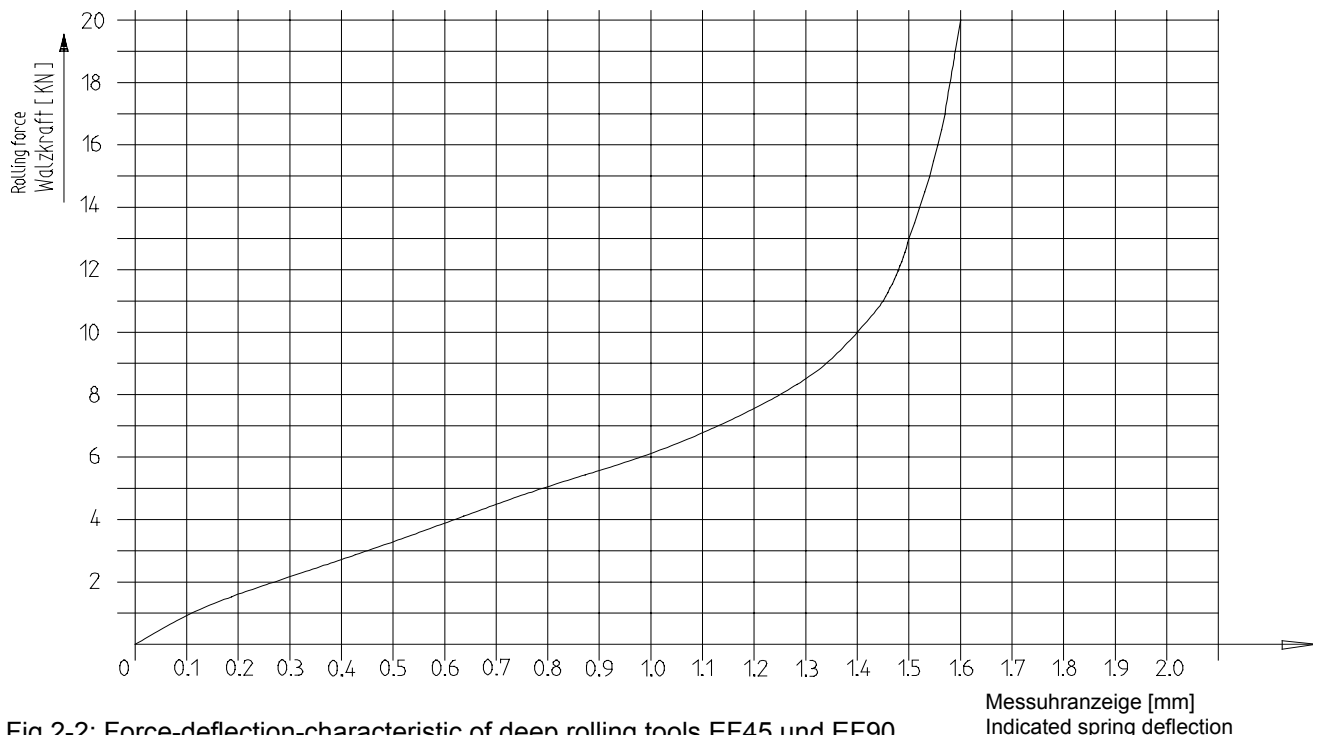


Fig.2-2: Force-deflection-characteristic of deep rolling tools EF45 und EF90

chanical tools, the rolling force is controlled by leaf springs and the infeed is monitored by measurement of the spring deflection during the process. The rolling force built up is delayed at the beginning of the treatment, held constant or if necessary it

may be varied during the treatment and is slowly released before the end of the treatment. This applies to the plunge in deep rolling method for small fillets and for the feed method for large surfaces as well. This approved procedure guarantees that rapid stress changes can not be generated at the beginning and at the end of the deep rolled zones. This avoids reduction of fatigue strength by sudden stress transitions.

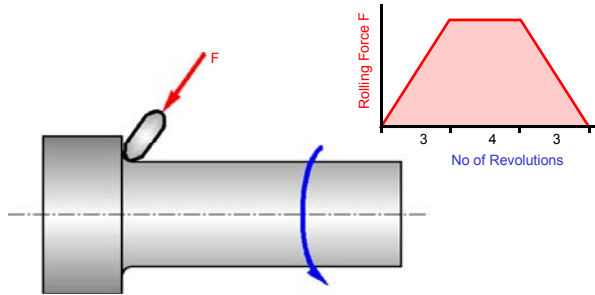


Fig. 2-3: Plunge-in deep rolling

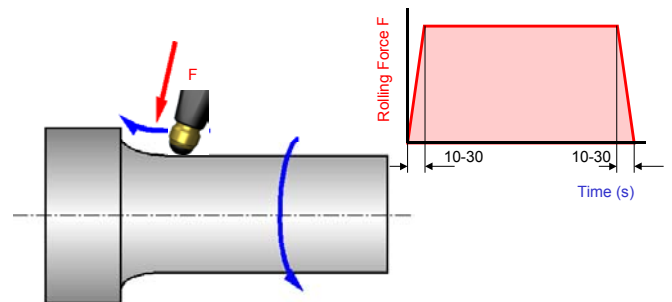


Fig. 2-4: Deep rolling with feed

Additional monitoring features can be put in the treatment of components with high damage risk. They may trigger a warning signal or the automatic program interruption upon inadmissible deviations. In addition, solutions are realized, with an automatic checkup of all tool functions including the rolling force and the rolling resistance before every working cycle of the tool.