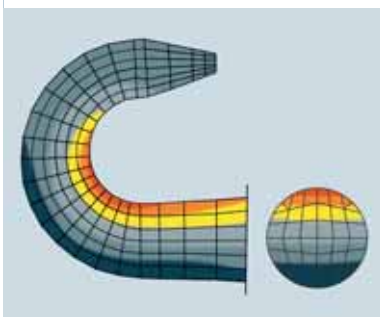




THE CONICAL HOOK FOR EXTREME DEMANDS



High machine speeds and the wide range of different yarns and constructions to be processed in modern knitted fabric production expose the needle hook to an enormous degree of stress. To withstand this, needles must be designed with the necessary stability to permit the processing of critical yarns while providing a geometry which offers maximum scope for different constructions and stitch densities.

Groz-Beckert developed its conical hook to address the stringent demands placed on today's knitting machine needles.

Process reliability, fabric quality and productivity are increased and needle consumption reduced.

THE CONICAL NEEDLE HOOK: A COMPARISON

REINFORCED HOOK, ENLARGED HOOK INTERIOR



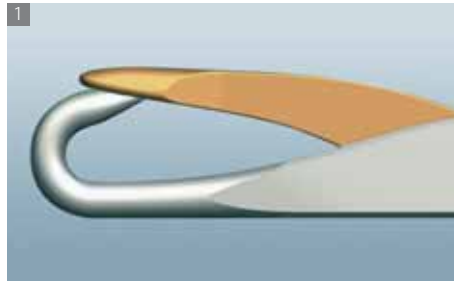
During the knitting process, the hook, and in particular the bottom of the hook, is subjected to enormous levels of strain. If additional stress is added by knots, slubs, double and multiple threads, the hook is susceptible to breaking or bending open once the elasticity limit is exceeded.

The result is higher needle consumption, more frequent machine standstill periods and poorer fabric quality.

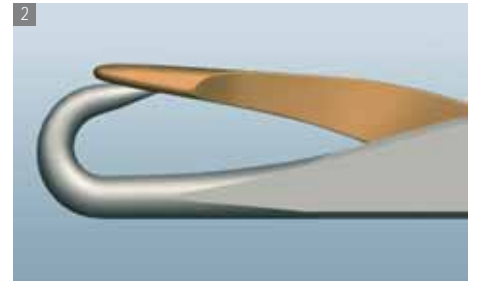
As a partner to the textile industry, the answer we have developed to address this challenging problem is the conical hook.

Hook shape

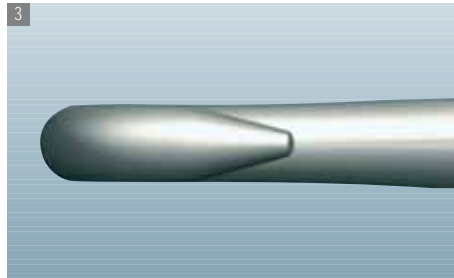
The conical hook (Fig. 4 and 6) provides an enlarged cross-section at the bottom of the hook, and tapers continuously to the tip. This hook shape not only helps reinforce the hook but also increases the size of the hook interior.



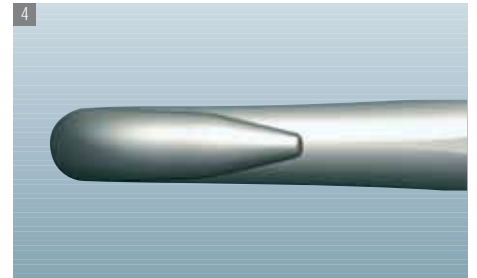
CYLINDRICAL HOOK



CONICAL HOOK



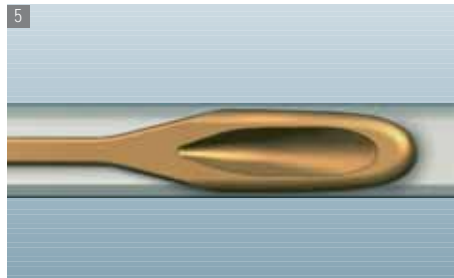
CYLINDRICAL HOOK, TOP VIEW



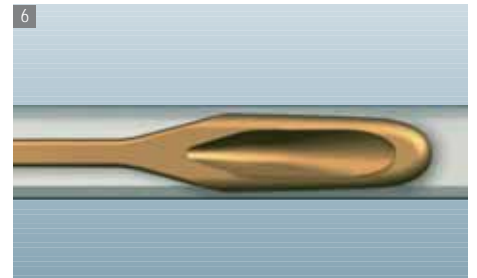
CONICAL HOOK, TOP VIEW

Hook tip

The smaller diameter of the hook in the area of the hook tip means that the latch spoon can be reduced in width. This permits a softer transition between the shank and head of the latch in needles with conical hooks.

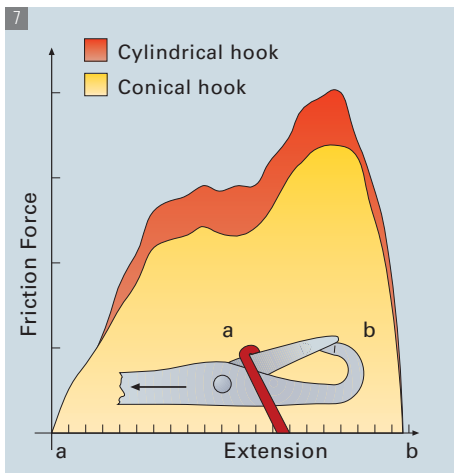


CYLINDRICAL HOOK / LATCH SPOON, TOP VIEW



CONICAL HOOK / LATCH SPOON, TOP VIEW

LONGER SERVICE LIFE THROUGH REDUCED WEAR



Force measurements taken in our laboratory clearly demonstrate (Fig. 7) that the softer transition between the latch shank and head substantially reduces friction forces in the case of the conical hook in comparison with the cylindrical hook.

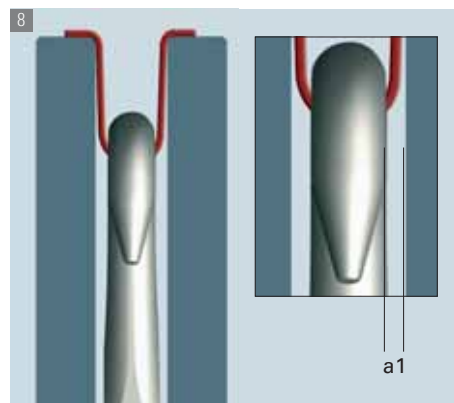
This is the underlying requirement for improved stitch gliding properties and ensures maximum protection of the yarn during casting off. The result: flawless, beautifully even knitted fabric.

Reducing the latch head width also brings about a reduction in the weight of the latch and consequently in the wear caused by latch impact on the hook in the latch seat and on the latch.

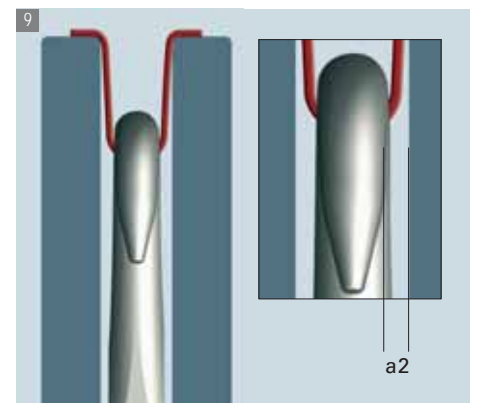
By reducing wear in the stitch forming part of the needle, needle life can be substantially improved.

Thread clearance

The conical hook permits the needle to be designed for greater clearance between the needle head and sinker than is the case in conventional needles with cylindrical hooks. This allows both effect yarns and poorer quality yarns with slubs and knots to be processed without problems to an optimum standard of quality.



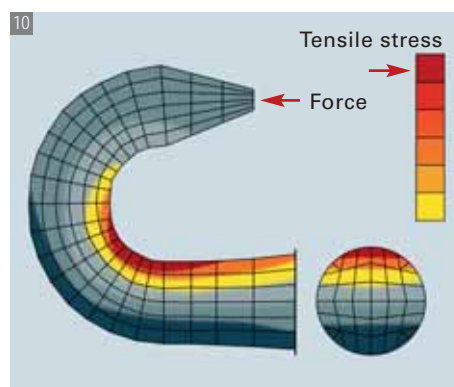
CYLINDRICAL HOOK



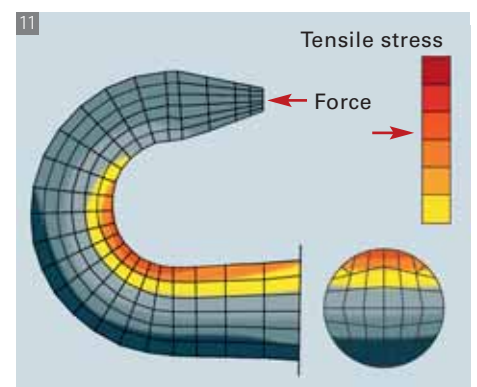
CONICAL HOOK

Tensile stress

Use of the Finite Element Method permitted the optimum reinforcement to be determined at the bottom of the hook. If we compare the tensile stress occurring in the cylindrical hook (Fig. 10) with that in the optimized conical hook, it becomes evident that the maximum tensile stress levels have been successfully reduced in the susceptible area at the bottom of the hook under the same level of stress due to the conicity of the hook.



CYLINDRICAL HOOK, ROUND CROSS SECTION

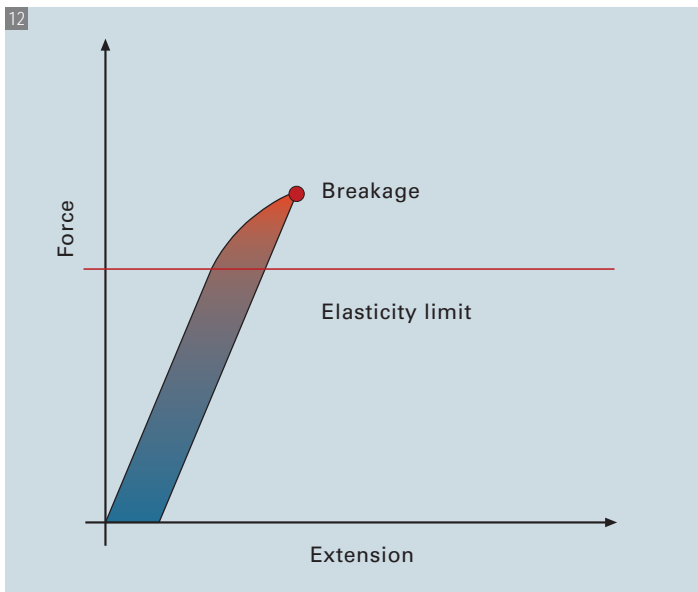


CONICAL HOOK, ROUND CROSS SECTION

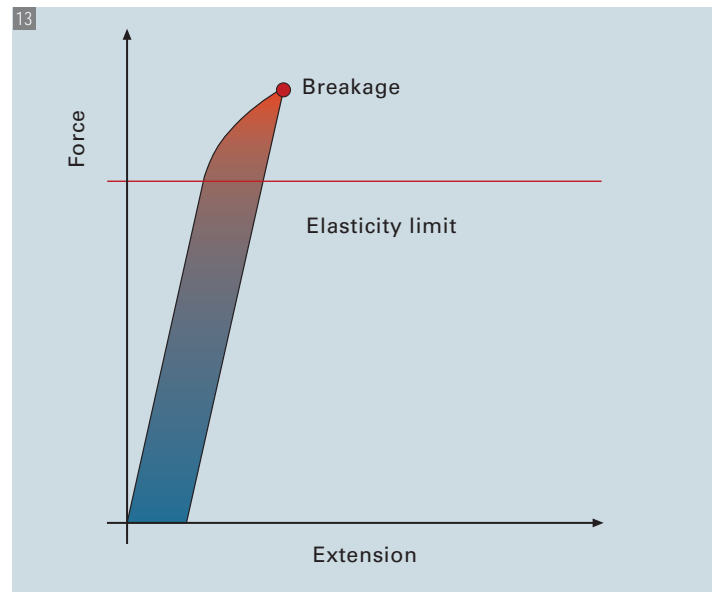
QUALITY THROUGH OPTIMUM GEOMETRY

Hook forces

Comparative measurements of hook forces (Fig. 12 and 13) back up these calculations. The conical hook demonstrates far greater capacity to withstand occurring forces. Depending on the needle type and field of application, our development engineers are working continuously to improve and further develop the optimum geometry of the conical hook.



CYLINDRICAL HOOK



CONICAL HOOK

Benefits

Groz-Beckert needles with conical hook offer the following benefits:

- Greater process reliability
- Higher fabric quality
- Higher productivity
- Reduced needle consumption

GROZ-BECKERT KG

P.O.Box 10 02 49

72423 Albstadt, Germany

Phone +49 7431 10-0

Fax +49 7431 10-2777

E-Mail: contact@groz-beckert.com

www.groz-beckert.com