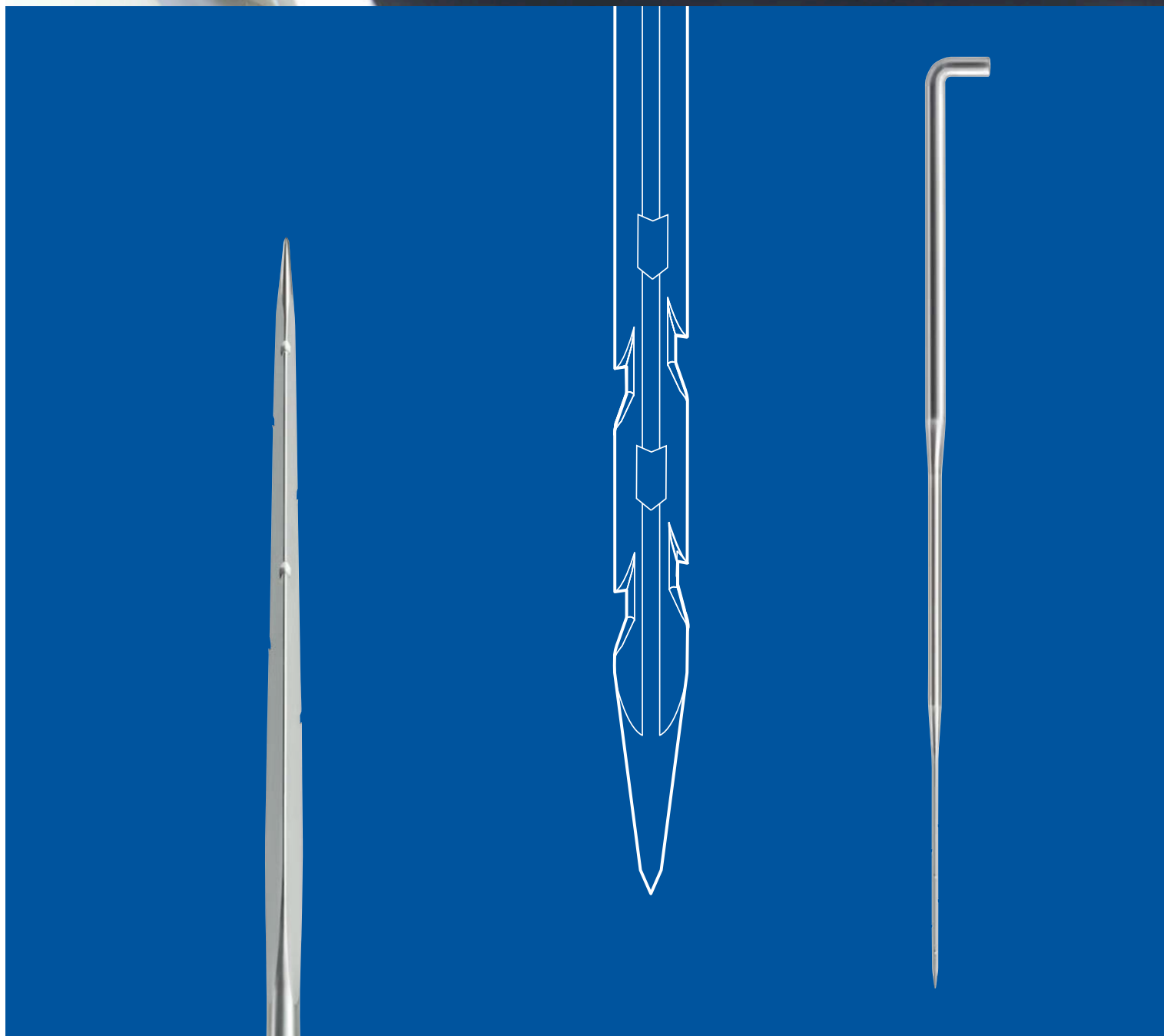
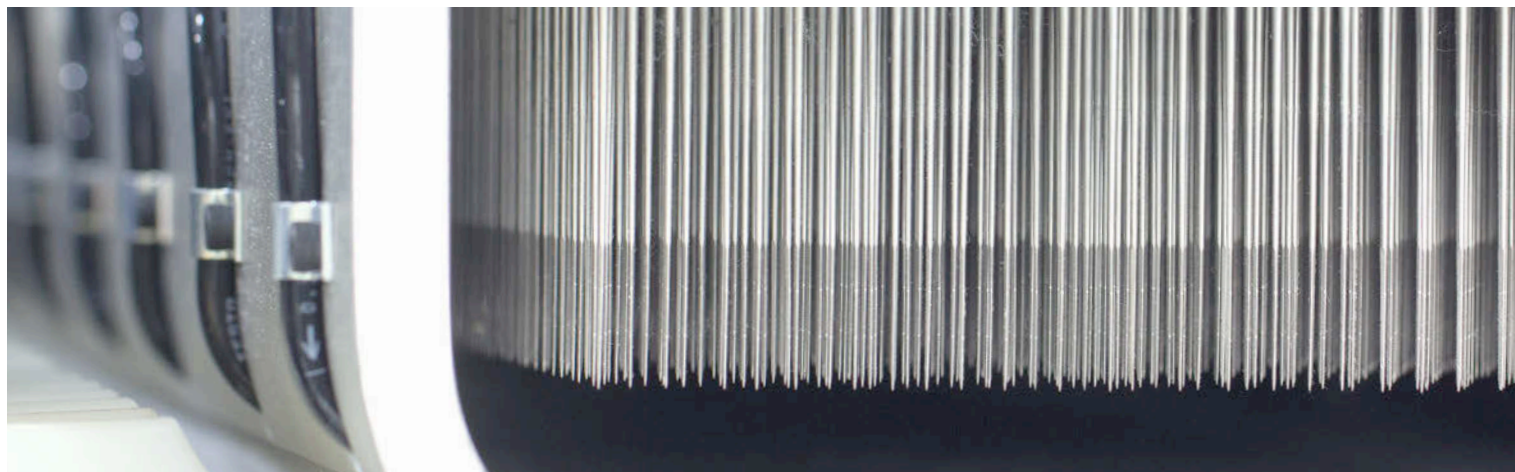


Felting Needles

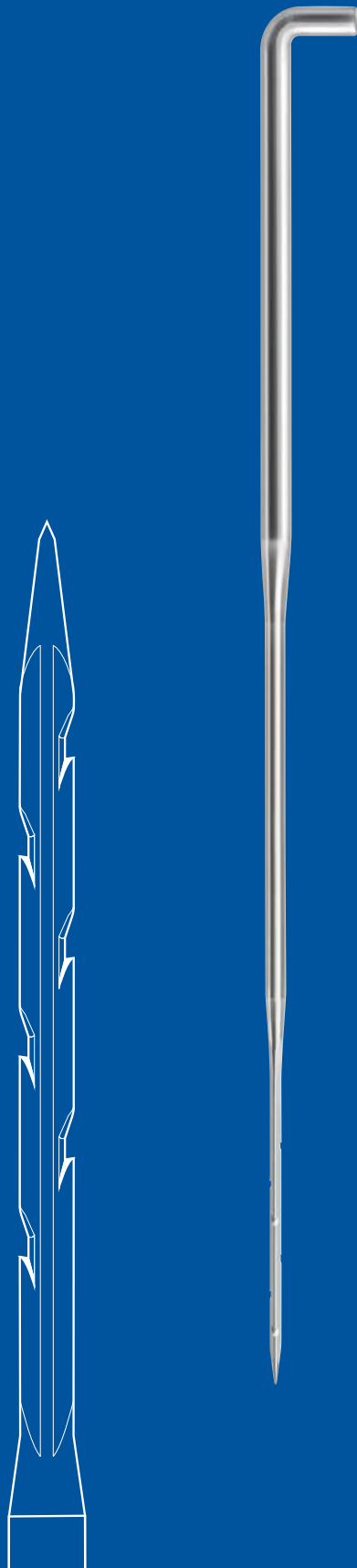


Foster – high quality since 1956

Foster Needle began operation in 1956. During the more than 60 years since then, the company has grown to become one of the world leaders in the production and sales of felting needles for the nonwoven and other textile industries. The company was founded by Edson P. Foster. Sr. Mr. Foster was born and raised in Torrington, CT, USA, where in those days the world's largest needle company – the Torrington Company – was located. Working for this company gave Mr. Foster the basis and inspiration for creating his own needle company after relocating to an area possessing a technically skilled work force, Manitowoc, WI.

Being a highly talented engineer, Mr. Foster went on to create the designs and patents for most of the blade shapes and barb shapes that are now standard to needlepunch firms in every country. The most important of the patented new designs was the Foster Formed Barb™, the first barb with rounded interior surfaces to be produced and to become a commercial success!

Today, Foster Needle offers technical services and superior products valued throughout the Nonwoven Needlepunch Industry. With first class production facilities and world wide distribution Foster Needle continues to offer the highest level of service in the industry.



Formed Barb™

The most important of all felting needle developments has been the Foster Formed Barb™. The Foster Formed Barb™ is simply the best barb design available. It is designed to last longer and interlock fibers better than any other barb design.

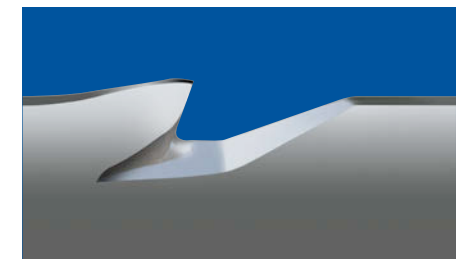
The Foster Formed Barb™ is also designed to minimize fiber damage. Needle punched nonwovens create fabric strengths through barbs repeatedly penetrating a fibrous web and mechanically reorienting these fibers into a strong fibrous mat. Because needle punching can be detrimental to the fibers being used, it is important to utilize a barb shape which is designed to minimize fiber damage.

For this reason we have designed the Foster Formed Barb™ so that only rounded, smooth edges engage fibers. Unlike other barb types, there are no sharp jagged surfaces to cut and otherwise damage the fibers. The result is a needle punched fabric with superior tensile strength.

The Foster Formed Barb™ is put on almost every needle we produce, and is available in a variety of kick-up designations.



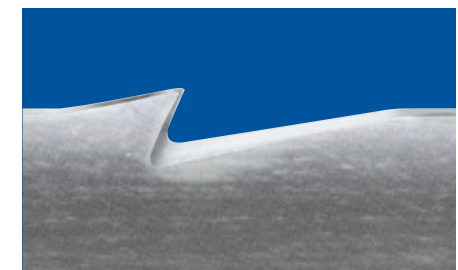
Foster "B" Barb



Foster "K" Barb



Foster "NK" Barb



Conventional Barb Design

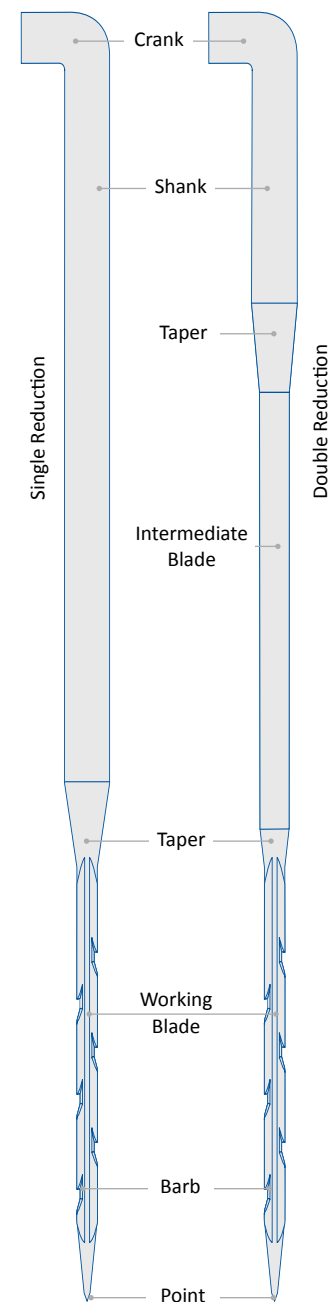
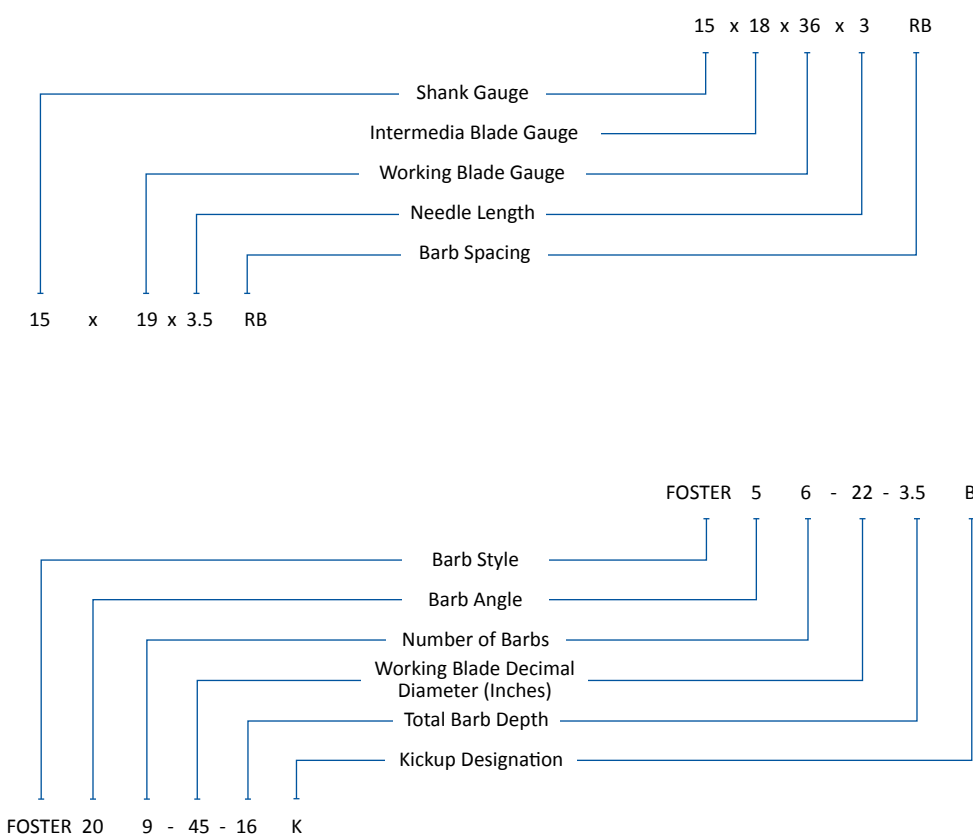


Nomenclature

Examples:

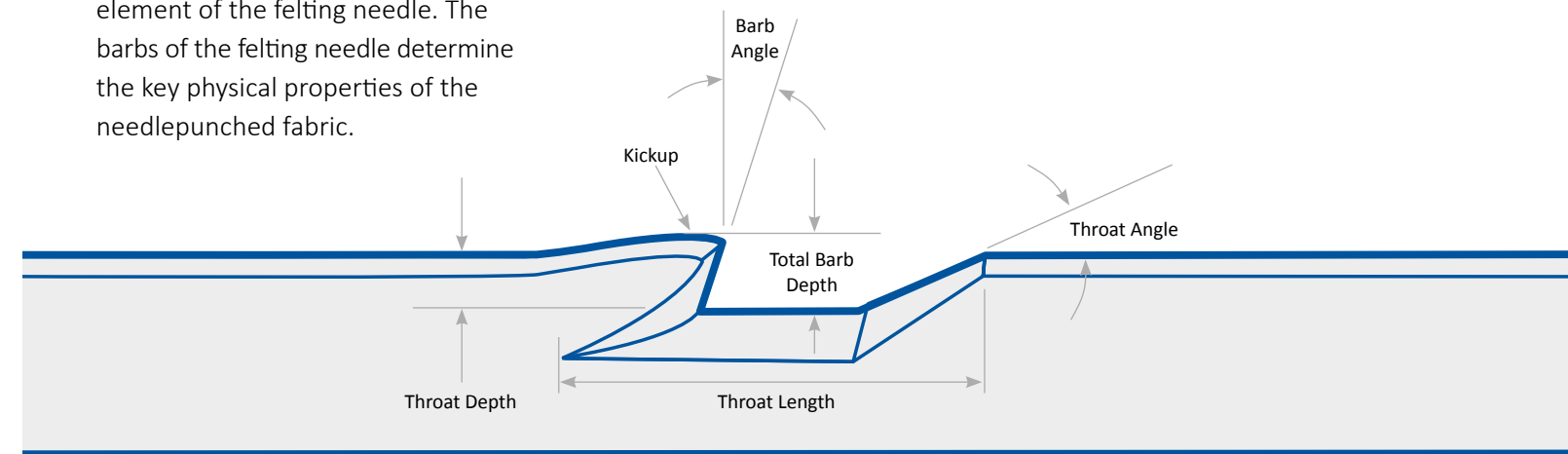
15 x 18 x 36 x 3 RB
FOSTER 5 6-22-3.5 RB

15 x 19 x 3.5 RB
FOSTER 20 9-45-16 K



Barb measurements

The barb is the single most important element of the felting needle. The barbs of the felting needle determine the key physical properties of the needlepunched fabric.



Barb Angle

The barb angle is the amount of degrees the fiber engaging surface is displaced from a vertical position.

The Foster Formed Barb™ is usually made with a 20 degree barb angle. It is important that the barb angle is precise and does not shift below specification. If the barb angle declines below 10–15 degrees, the fibers will slip off the barb face during penetration through the fiber web, thus affecting key physical properties in the web.

Throat Depth

The throat depth of the needle is the amount of barb that is below the apex of the triangle.

Total Barb Depth

The total barb depth of the needle is measured from the top of the barb to the very bottom. If there is **kickup** on the barb, it too is included in this measurement.

$$\text{Kickup (if any)} + \text{throat depth} = \text{total barb depth}$$

The total barb depth will determine how many fibers will fit into the barb. Determining the proper total barb depth for a particular application is critical.

Throat Angle

The throat angle is opposite the barb face. It affects the amount and the speed at which fibers fill into the barbs.

Throat Length

The throat length is simply the length of the barb. Larger barbs tend to have longer throat lengths and smaller barbs will tend to have shorter throat lengths.



Barb spacing

Foster Needle provides the optimum range of barb spacing. This variety is crucial in Nonwoven Needlepunch Industry due to the broad range of machine configurations, raw materials and finish product segments.

23.3 mm	.916"
21.2 mm	.833"
19.0 mm	.750"
16.9 mm	.666"
14.8 mm	.583"
12.7 mm	.500"
10.8 mm	.416"
8.5 mm	.333"
6.4 mm	.250"

RB

20.1 mm	.791"
18.0 mm	.708"
15.8 mm	.625"
13.7 mm	.541"
11.6 mm	.458"
9.5 mm	.375"
7.4 mm	.291"
5.3 mm	.208"
3.2 mm	.125"

RB-A

14.8 mm	.584"
13.8 mm	.542"
12.7 mm	.500"
11.7 mm	.459"
10.6 mm	.417"
9.5 mm	.375"
8.5 mm	.334"
7.4 mm	.292"
6.4 mm	.250"

CB

11.6 mm	.459"
10.6 mm	.417"
9.5 mm	.375"
8.5 mm	.334"
7.4 mm	.292"
6.3 mm	.250"
5.3 mm	.209"
4.2 mm	.167"
3.2 mm	.125"

CB-A

19.1 mm	.752"
17.5 mm	.689"
15.9 mm	.626"
14.3 mm	.563"
12.7 mm	.500"
11.1 mm	.438"
9.5 mm	.375"
7.9 mm	.313"
6.4 mm	.250"

MB

15.9 mm	.627"
14.3 mm	.564"
12.7 mm	.500"
11.1 mm	.438"
9.5 mm	.375"
7.9 mm	.313"
6.3 mm	.250"
4.7 mm	.188"
3.2 mm	.125"

MB-A

15.5 mm	.607"
14.2 mm	.556"
12.9 mm	.505"
11.6 mm	.454"
10.3 mm	.403"
9.0 mm	.352"
7.7 mm	.301"
6.4 mm	.250"

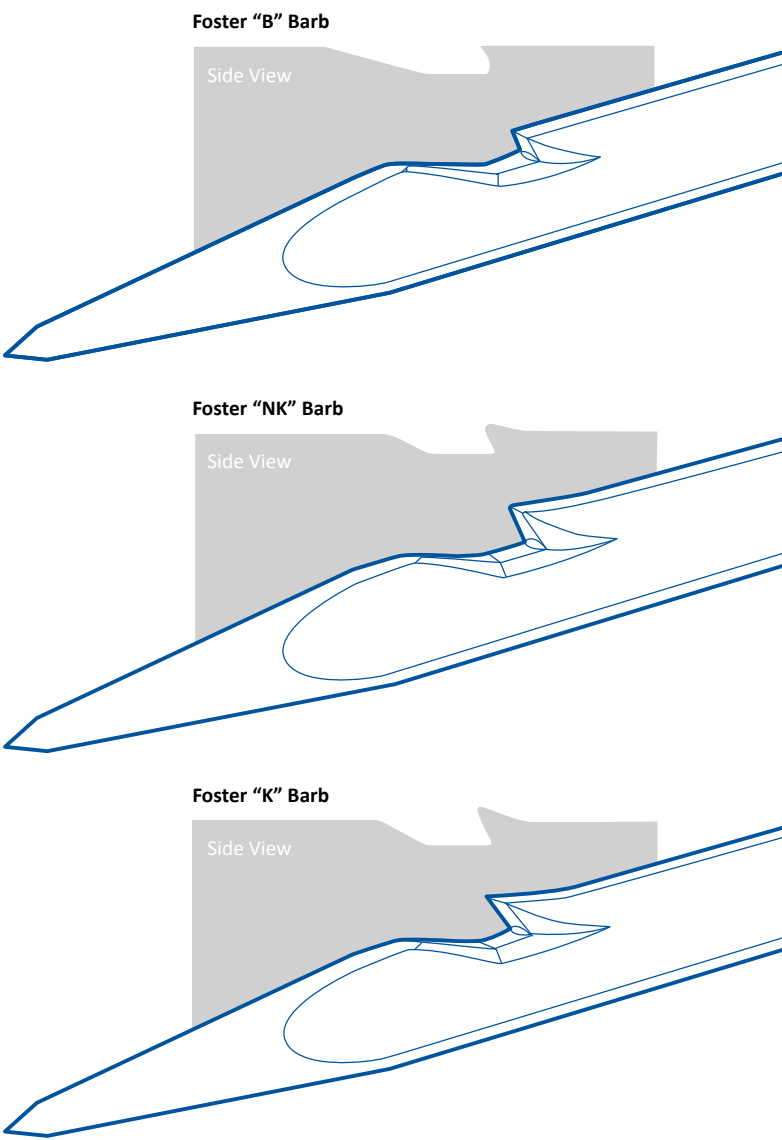
HDB-PF

Kickup types

The particular kickup level to be used is determined by many factors, such as the fabric type, fiber type, needle loom density, and much more. "Kickup" is the projection of the barb above the edge into which it is formed. Kickup can be made so that it is very high, or in decreasing size so that there is no protrusion at all.

The illustration at right shows the three basic Foster Needle kickup configurations. "B" barbs feature zero kickup. With "NK" barbs, approximately 20 % of the total barb depth is kickup. With "K" barbs, approximately 40 % of the total barb depth is kickup.

The Foster Formed Barb™ can be made with a variety of different kickup levels.



Staggered barb

The Staggered barb needle is useful in needlepunching of padding and wadding which is often made with recycled or regenerated fibers and rads.

The Staggered barb is produced with barbs that progressively deepen as they go up the needle's blade section. This progression in barb depth allows the smaller barbs near the point of the needle to more easily penetrate the web with less loading. Since the deeper barbs are located in the middle and back portion of the blade, more fiber load will be transferred to this area than if the barbs were not staggered. The staggering of barb depths from shallow to deep results in less fiber loading at the point of the needle and more fiber loading in the middle and back sections. This reduces needle breakage, and increases the efficiency of the needlepunching operation.

Example:

FBC5232778 15x18x32x3.5 MB

F20 8-3/4/4.5NK/STAG/CC

Conical blade

The Foster Conical needle has a blade section which is tapered from the needle's point along its entire length to where it meets either the shank or intermediate. The Conical shape of the blade allows the thinnest portion of the needle to more easily penetrate the web. Its barbs also increase in size from the point to the back portion of the blade, allowing the needle to more easily penetrate the web.

The Conical blade is used primarily in areas of high needle breakage usually associated with recycled or natural fibers such as cotton, flax, jute, and shoddy. The Conical blade is not ideal for all applications, as the needle may create larger needle holes on the fabric surface.

Example:

CON: 15 x 17 x 36 x 3.5 RBA F 20

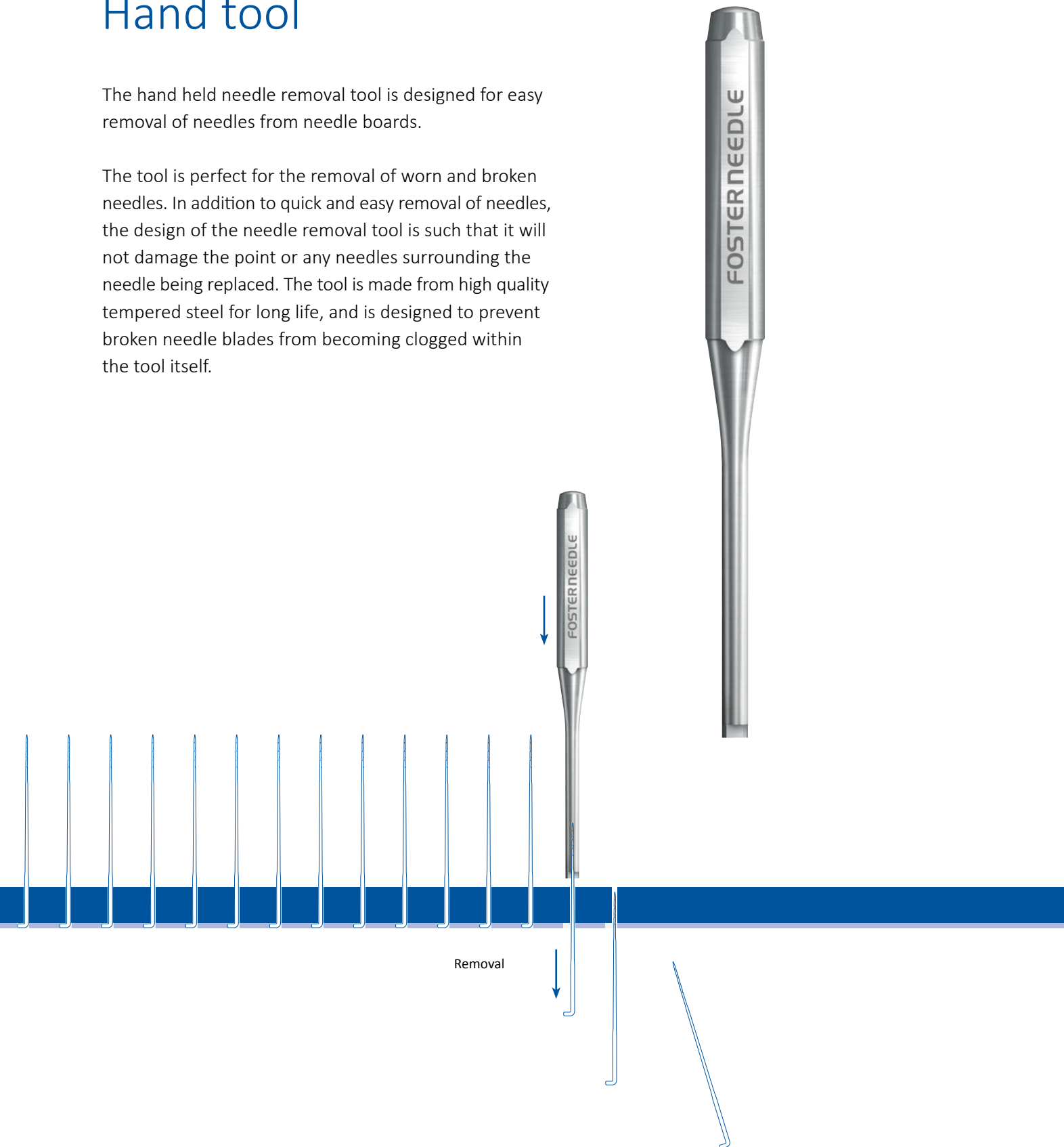
6-2.3B/3.1B/CON/CC



Hand tool

The hand held needle removal tool is designed for easy removal of needles from needle boards.

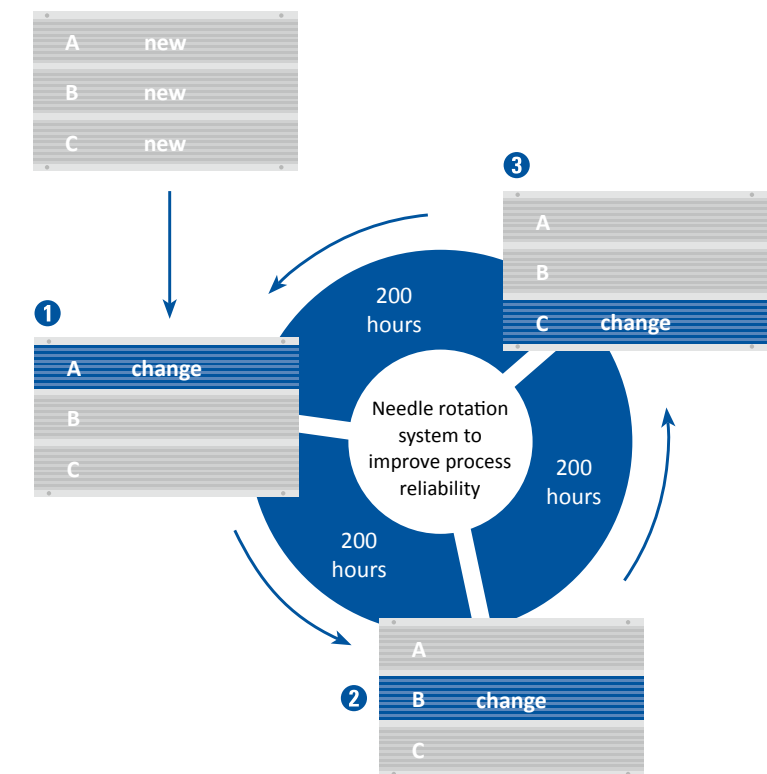
The tool is perfect for the removal of worn and broken needles. In addition to quick and easy removal of needles, the design of the needle removal tool is such that it will not damage the point or any needles surrounding the needle being replaced. The tool is made from high quality tempered steel for long life, and is designed to prevent broken needle blades from becoming clogged within the tool itself.



Needle rotation

Needle rotation is important to the production of most needlepunched nonwovens, because it is difficult to estimate the life of a felting needle. Many factors influence needle wear, including: fiber type, denier, fabric weight, loom speed, needle density, needle type, and more. The degree to which you interlock fibers depends on the needle and its efficiency. As needles begin to wear they become less efficient, and will reduce the quality of the finished fabric. Barb angles can wear away to the point where there is insufficient fiber transportation to effectively interlock fibers and produce the desired physical properties of the web. Warning signs of worn needles include uneven web weights, poor tensile strengths, and needle tracks on the surface of the fabric.

To prevent these problems we recommend needle rotation programs where new needles are inserted into complete sections of the needle boards at predetermined times. The most common needle rotation program involves dividing needle boards into thirds. Color coding these sections will make rotation easier for everyone to track and understand.



Typical Barb Wear

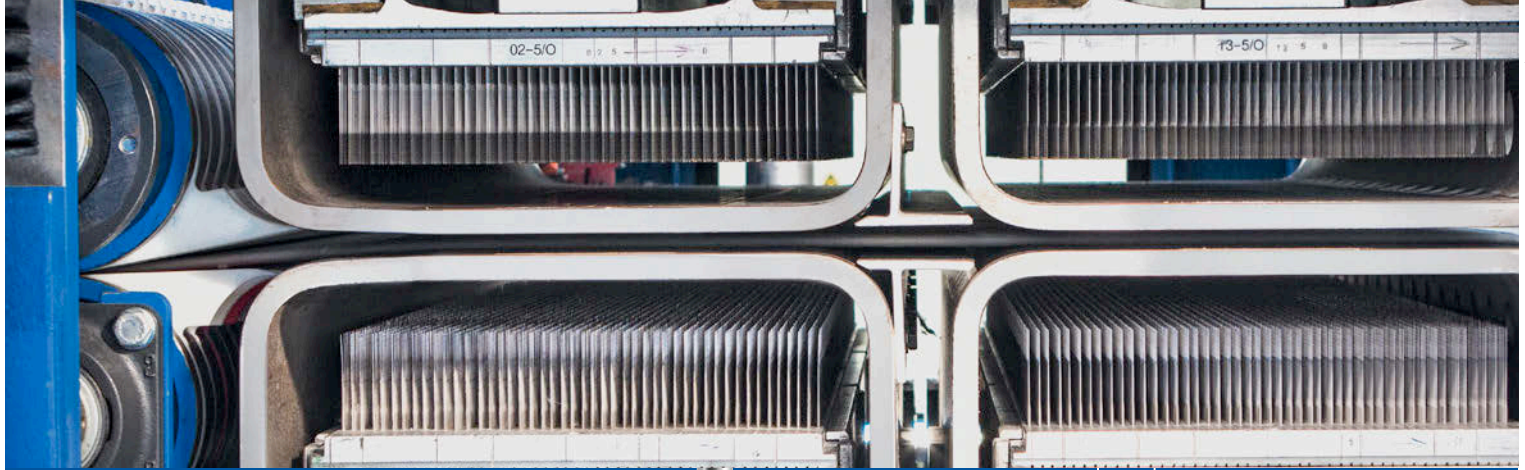
Basically, most rotation programs are set up so that one third of the needle board is replaced after every predetermined number of penetrations. Fabric quality can be greatly enhanced with the use of needle rotation programs. Foster Needle can customize a needle rotation schedule for each customer. Please let us know if we can help you set up your own needle rotation schedule.



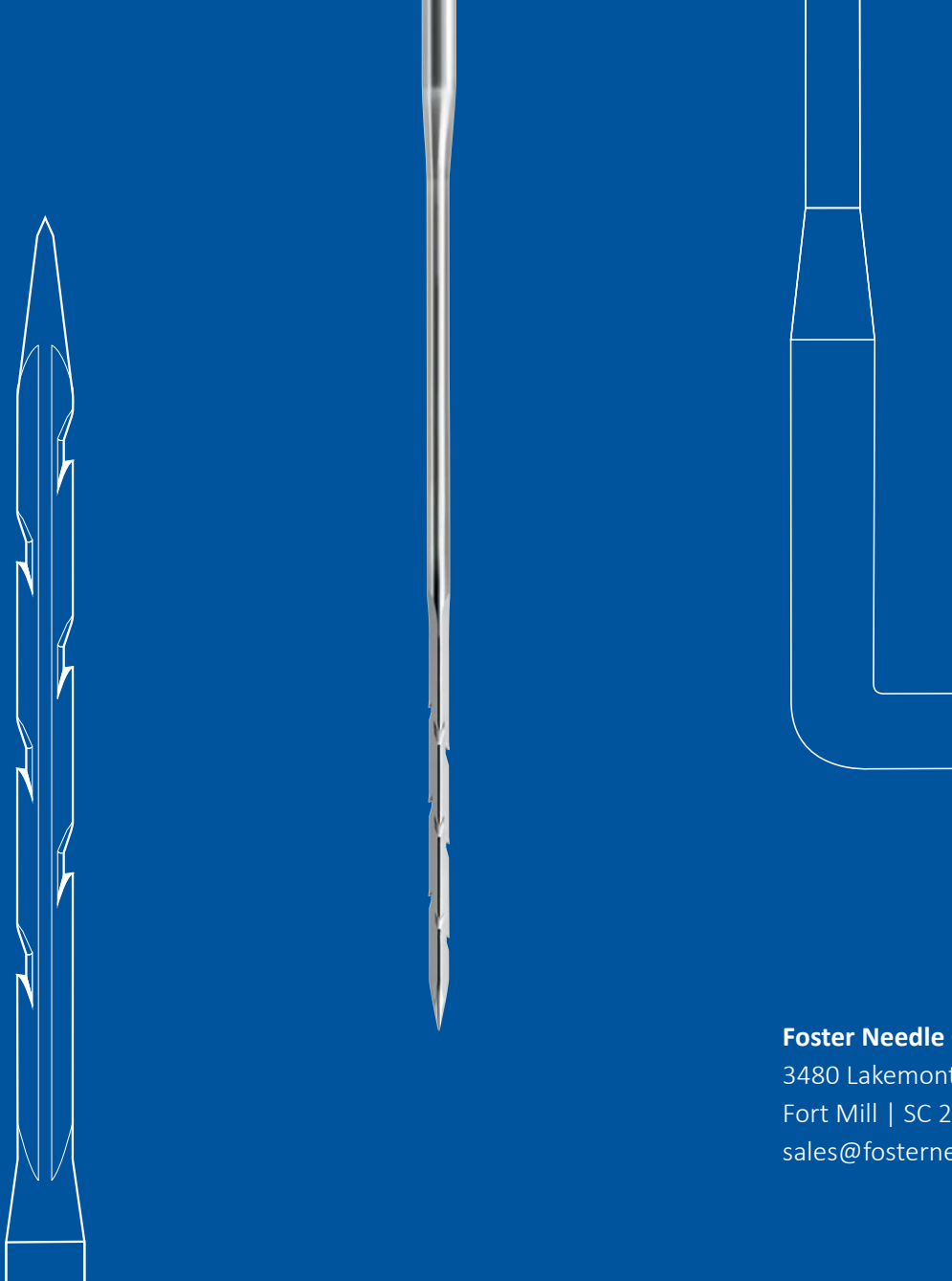
www.fosterneedleusa.com

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