

A close-up photograph of a sewing machine needle stitching a piece of orange fabric. The needle is positioned vertically, and the thread is visible as it passes through the fabric. The background is slightly blurred, showing the metallic components of the sewing machine. The text "WELDING" is overlaid in the center of the image.

WELDING

**A SEAMING
ALTERNATIVE?**

Contents of Presentation

- Sewing vs. Welding
- Weldability
- Available Technologies
- Applications
- Possibilities
- Limitations

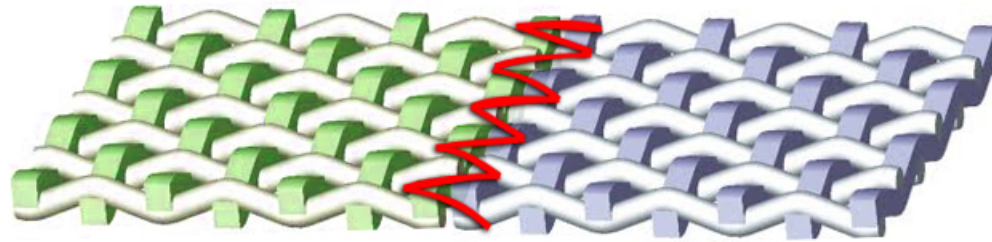
Sewing vs. Welding

Common Aim:

**Permanently join material plies
together**

Sewing vs. Welding

Differences

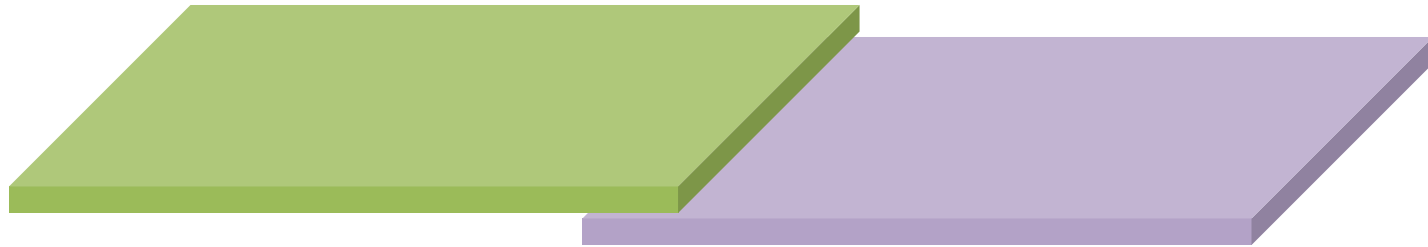


Sewing is continuous joining of two or more plies of material by penetrating the material with a needle and use of a third material (thread)

The seam is elastic!

Sewing vs. Welding

Differences



Welding is clocked or continuous joining of two plies of material by liquefying the material and pressing it together.

Material is not penetrated and no third material (thread, glue) is required. The seam has limited elasticity.

Weldability

What Materials can be welded?

“All flexible, laminar thermoplastics”

Weldability

What are thermoplastics?

“All plastics that liquefy when exposed to heat”

Such as

PVC (Polyvinyl chloride)

PU (Polyurethane)

PA (Polyamide / Nylon)

PES (Polyester)

PE (Polyethylene)

PP (Polypropylene)

Weldability

Thumb Rule

“You can only weld materials of the same type!”

Weldable:

PES with PES, PVC with PVC, etc.

Not weldable:

PES with PVC, PU with PES, etc.

Weldability

Welding Parameters

(Only for continuous welding processes in apparel manufacturing)

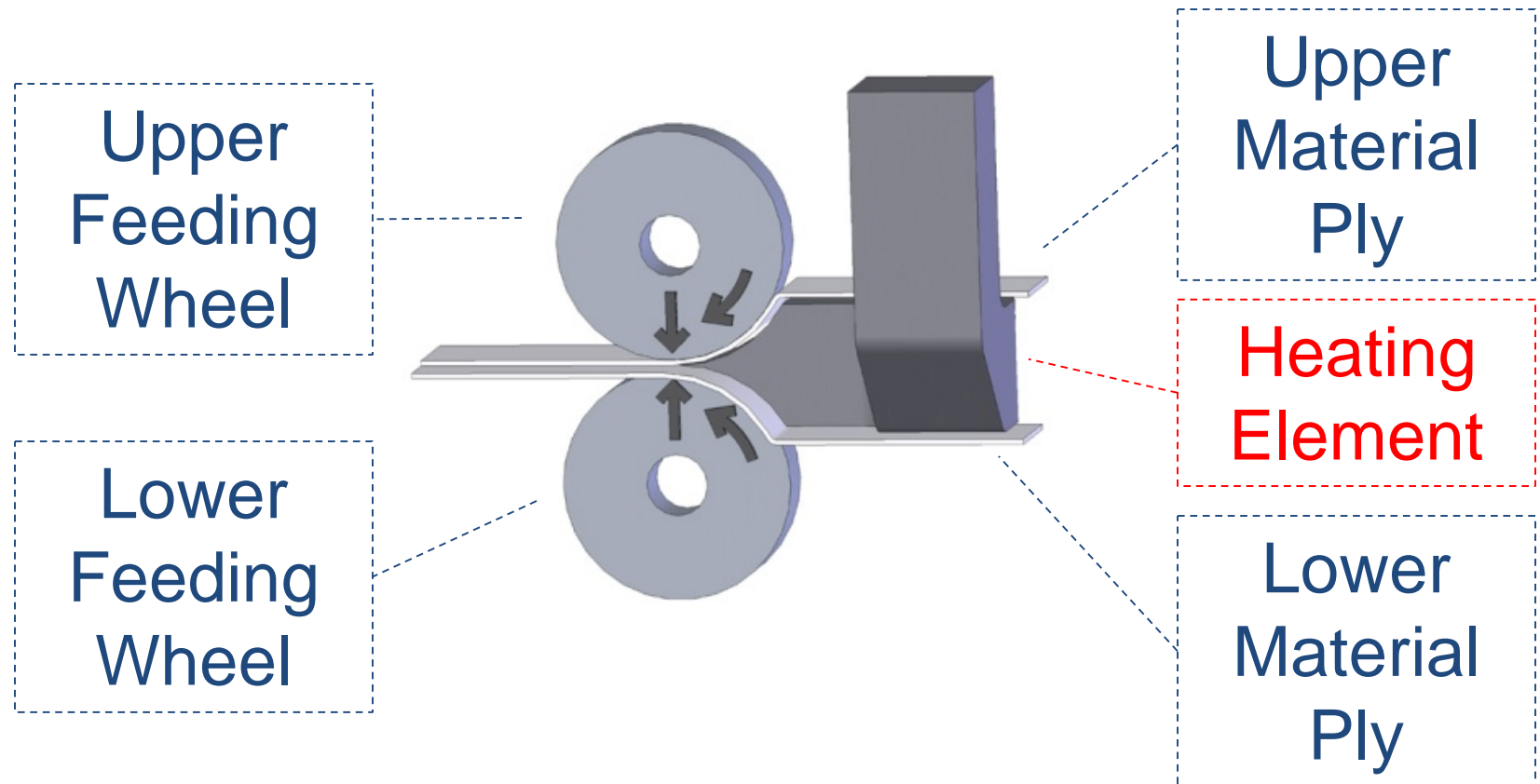
1.Heat

2.Pressure

3.Speed

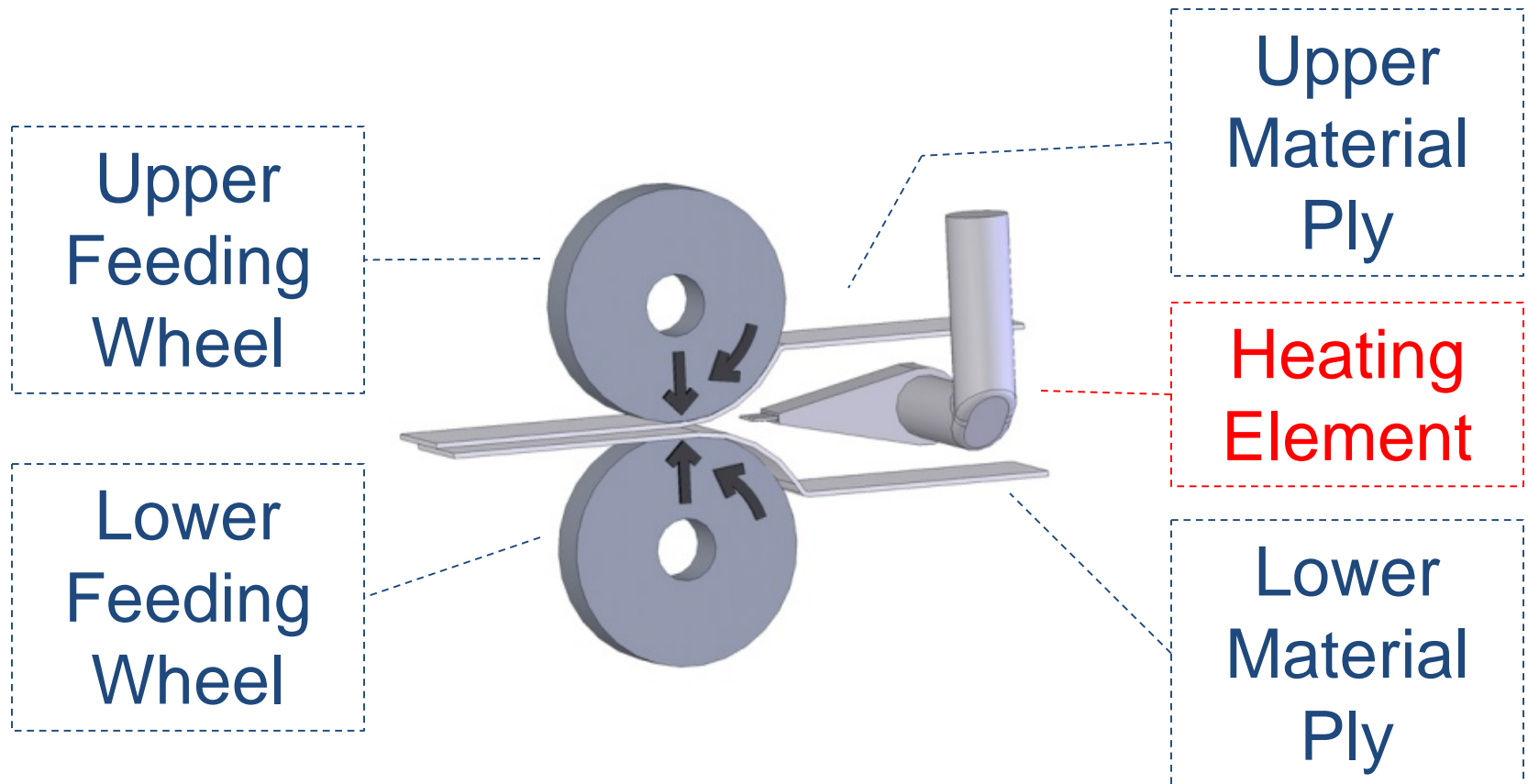
Available Technologies

Hot Wedge



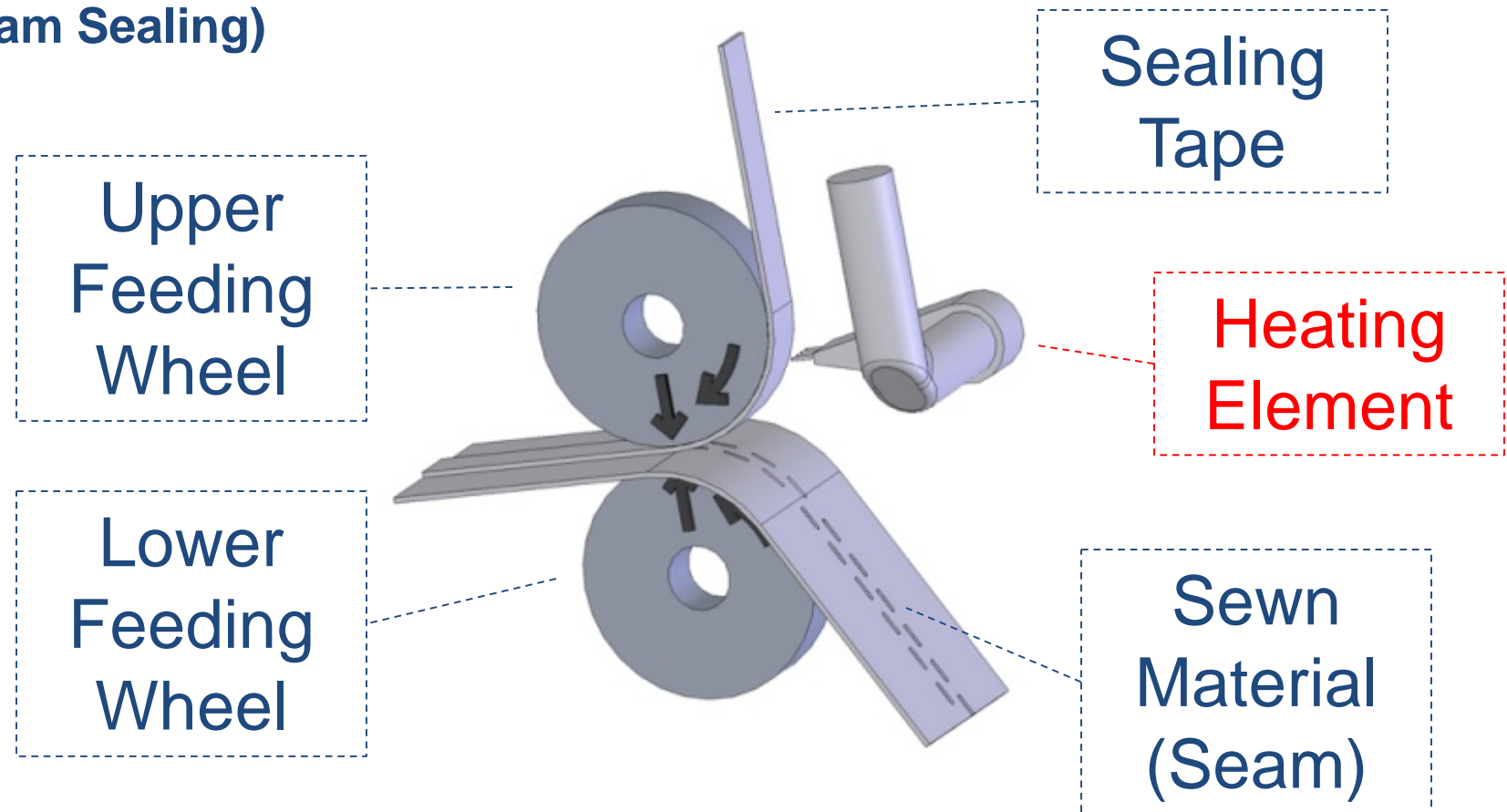
Available Technologies

Hot Air



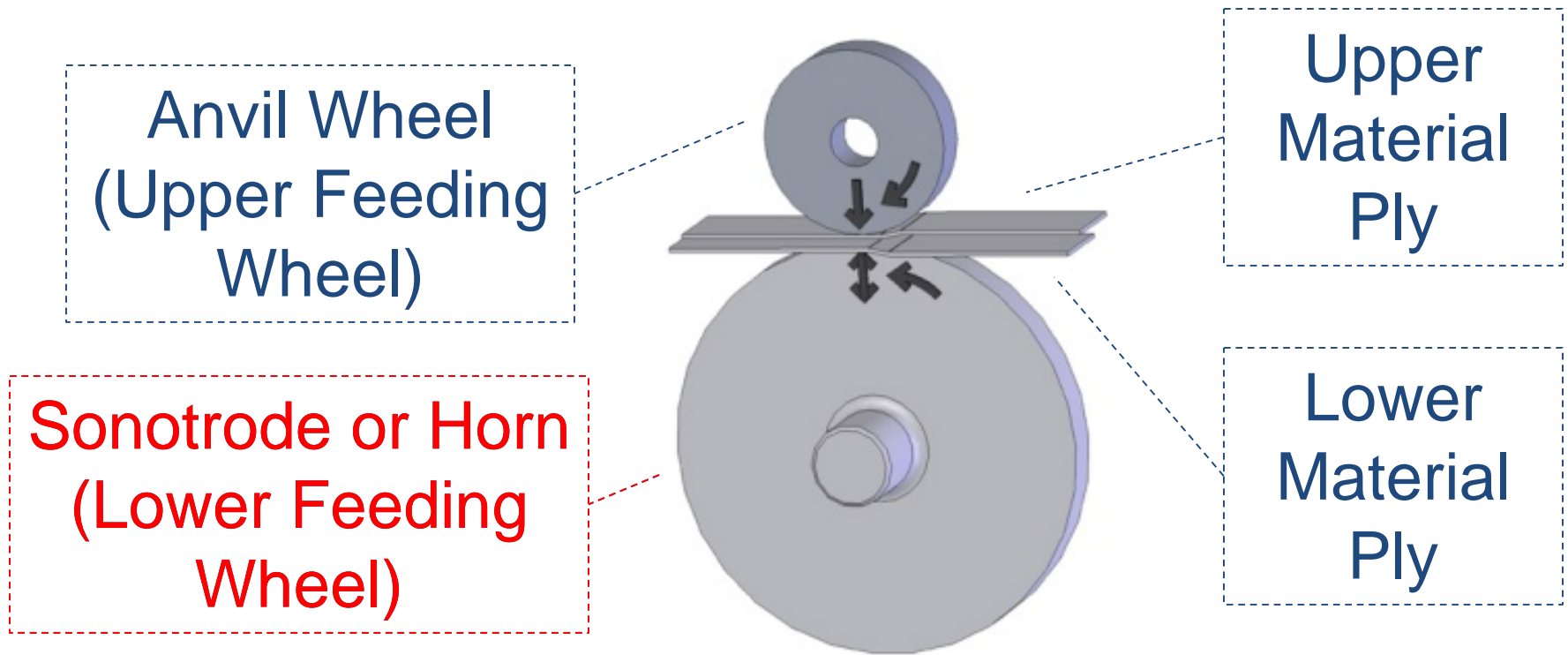
Available Technologies

Hot Air Tape Welding (Seam Sealing)



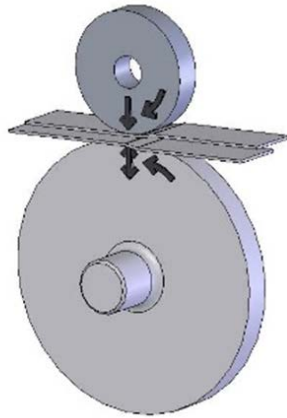
Available Technologies

Ultrasound



Available Technologies

Ultrasound (Available Sonotrodes)



Vertically rotating sonotrode and anvil wheel

35kHz technology

Inaudible to the human ear



Standing sonotrode and vertically rotating anvil wheel

20kHz technology

Audible to the human ear
Potentially noxious effect!



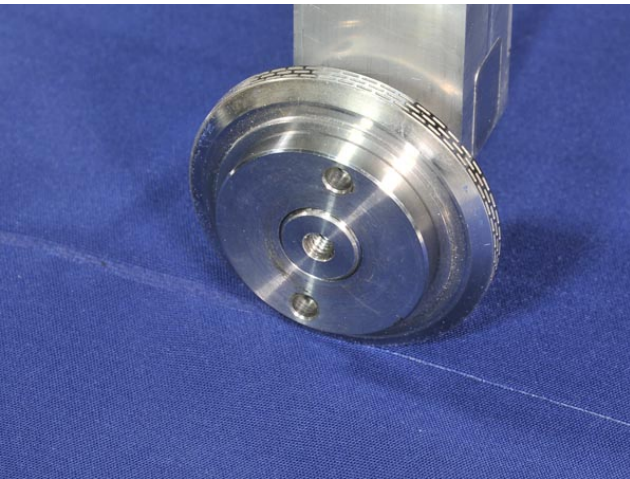
Horizontally rotating sonotrode and vertically rotating anvil wheel

20kHz technology

Audible to the human ear
Potentially noxious effect!

Available Technologies

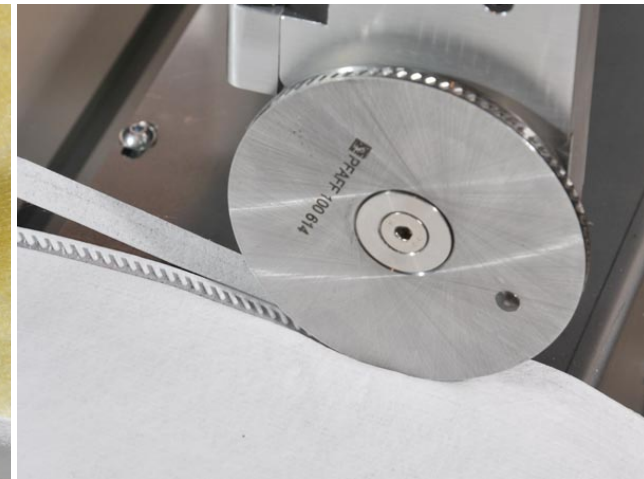
Ultrasound (Welding Methods)



Regular Welding



Cut and Seal



Dual System

Cut and Seal with
simultaneous
welding

Available Technologies *Differences*

Hot Wedge	Hot Air	Ultrasonic
Fabric thickness 0.2mm – 2.0mm	Fabric thickness 0.2mm – 2.0mm	Fabric thickness 0.05mm – 0.4mm
Welding only	Welding only	Welding only
		Cut and Seal
		Simultaneous Welding and Cut and Seal

Available Technologies *Pros*

Hot Wedge	Hot Air	Ultrasonic
<p>Low fume emission</p> <p>Very low noise emission</p> <p>Low air consumption</p>	<p>Very fast</p> <p>Very little wear</p> <p>Very simple adjustments</p> <p>Advantageous for cross seams</p>	<p>Inaudible (35kHz technology only)</p> <p>Instant heat and cool off</p> <p>Easy handling</p>

Available Technologies *Cons*

Hot Wedge	Hot Air	Ultrasonic
<p>Requires precise setting</p> <p>Cross seams and T-seams difficult</p>	<p>Comparatively high fume emission (PVC)</p> <p>Comparatively high noise emission</p> <p>High air consumption</p>	<p>Processing heavier fabric is difficult</p> <p>Cross seams and T-seams difficult</p>

Applications in Apparel Manufacturing

Seam Sealing:

- **Outdoor Clothing (e.g. Goretex[®])**
- **Protective Clothing (Hazmat Suits)**
- **Survival Gear**
- **Shoe Manufacturing**

Applications in Apparel Manufacturing

Ultrasonic Welding:

- **Outdoor Clothing**
- **Sportswear / Active Wear**
- **Protective Clothing (Hazmat Suits)**
- **Survival Gear**
- **Medical Garments**
- **Lingerie, Bras**

Possibilities

- **Creating a water- and airtight seam**
- **Programming of seam sequences with different seam values / parameters**
- **Reproducible seam settings (especially for safety relevant seams, e.g. on Hazmat suits)**
- **Settings are transferable from machine to machine**

Limitations

- **Welding more than two plies of material is difficult**
- **It is not possible to join different materials**
- **Binding or hemming of material is difficult**



WELDING

**A SEAMING
ALTERNATIVE!**