

**WELDING**

**A SEAMING  
ALTERNATIVE?**

# Contents of Presentation

- Sewing X Welding
- Weldability
- Available Technologies
- Applications
- Possibilities
- Limitations

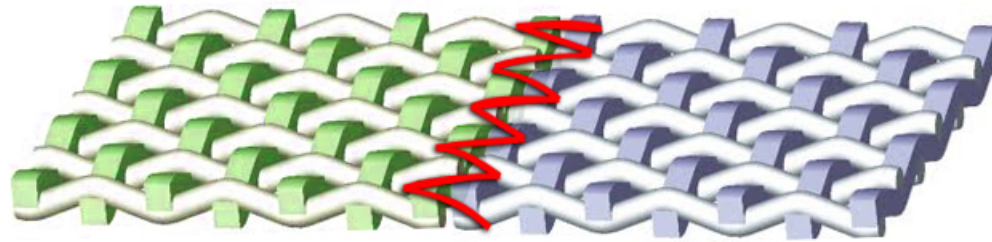
# Sewing X Welding

**Common Aim:**

**Permanently join  
material plies  
together**

# Sewing X Welding

## Differences

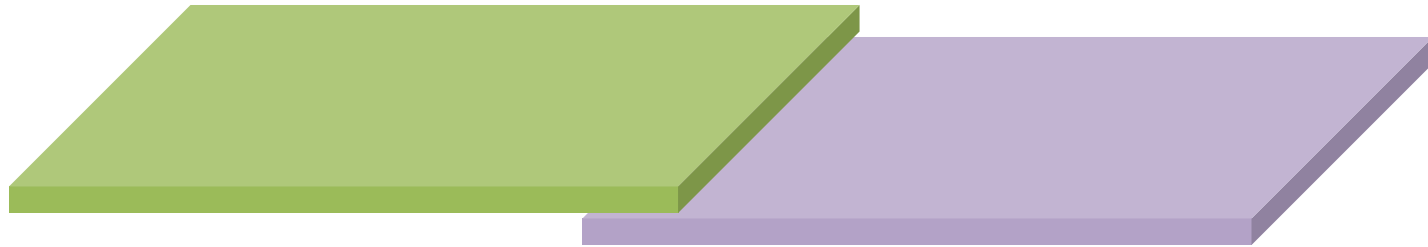


Sewing is continuous joining of two or more plies of material by penetrating the material with a needle and use of a third material (thread) to join

The seam is elastic!

# Sewing X 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)

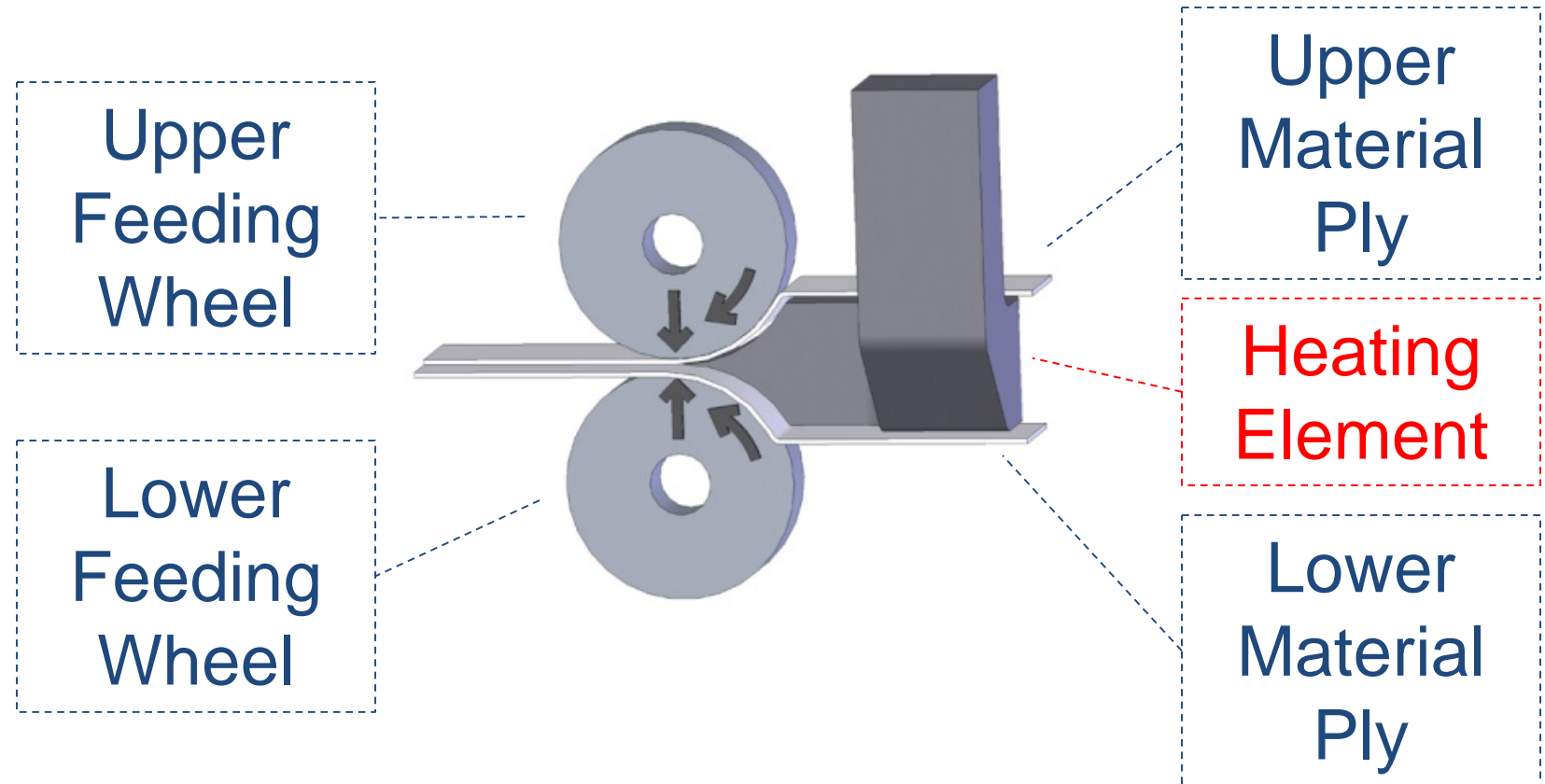
**1. Heat**

**2. Pressure**

**3. Speed**

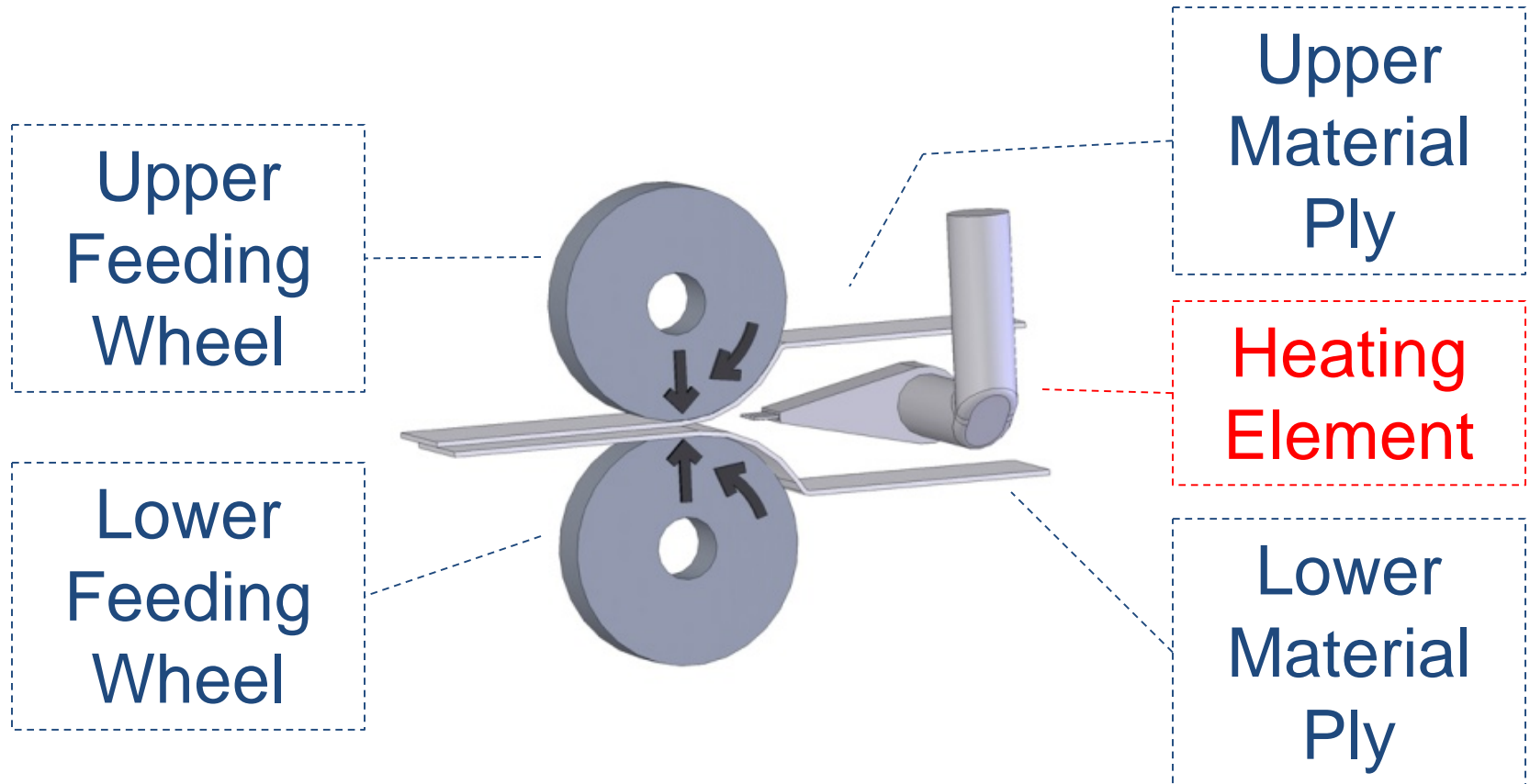
# Available Technologies

## Hot Wedge



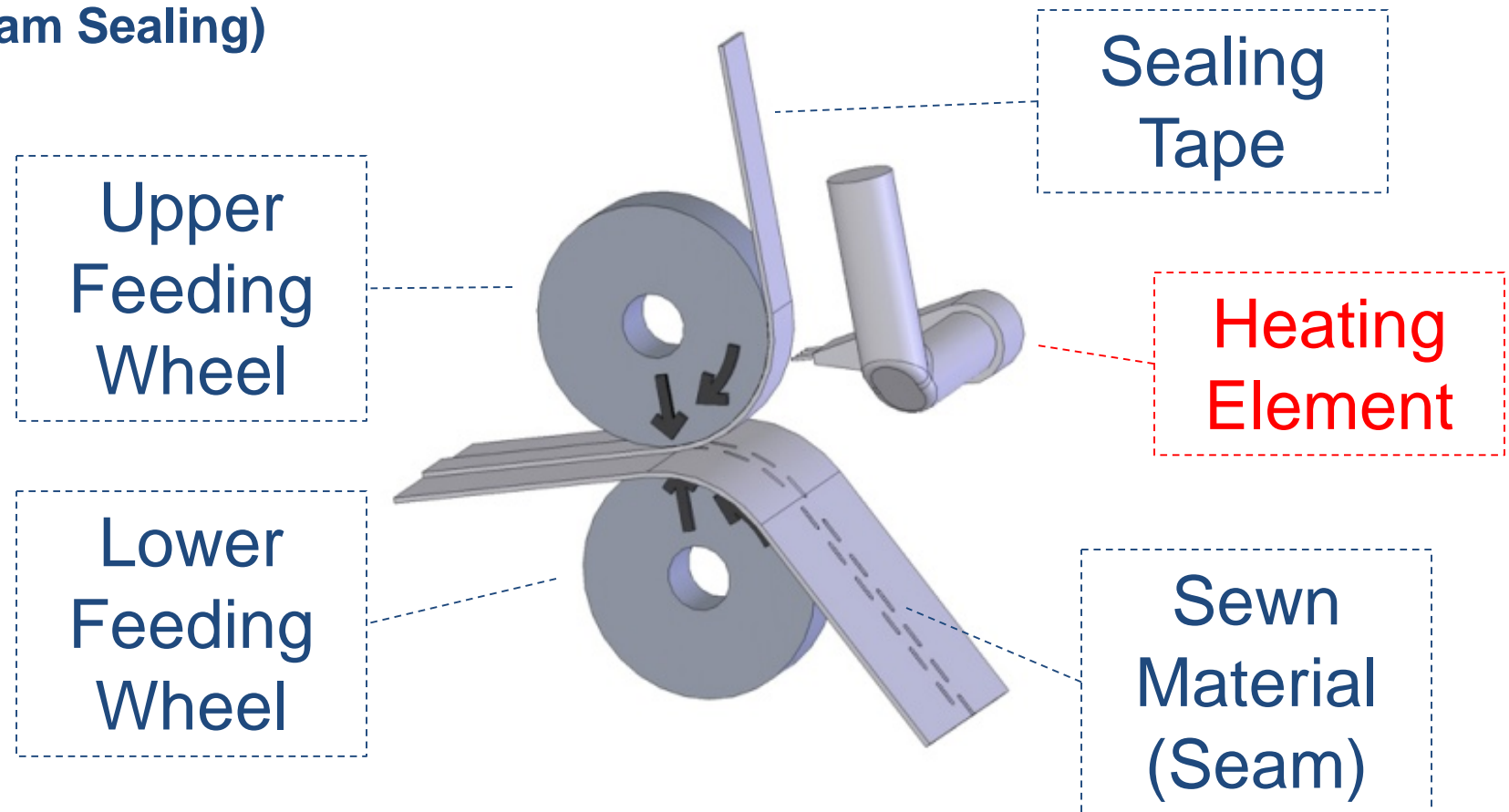
# Available Technologies

## Hot Air



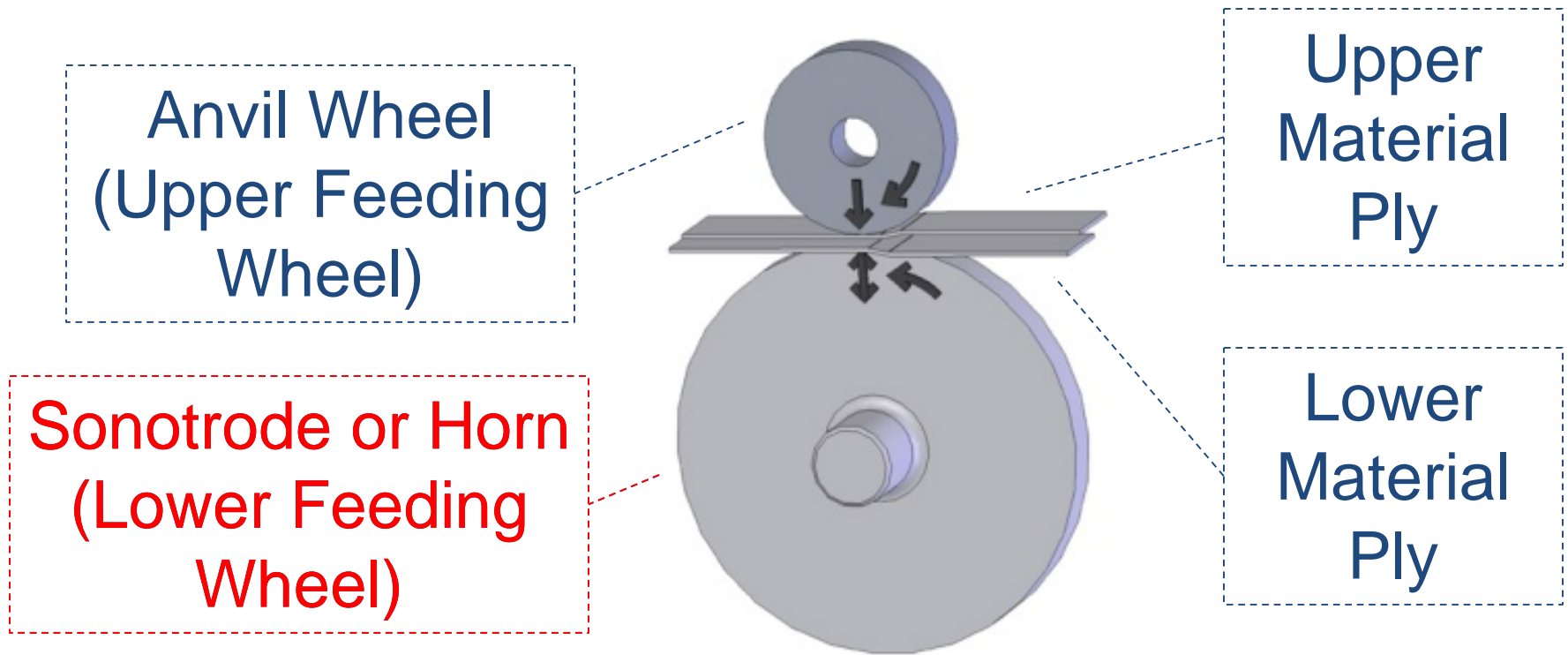
# Available Technologies

## Hot Air Tape Welding (Seam Sealing)



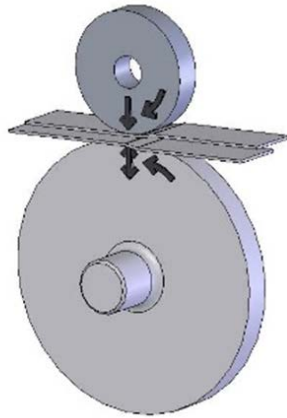
# Available Technologies

## Ultrasonic



# Available Technologies

## Ultrasonic - 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!



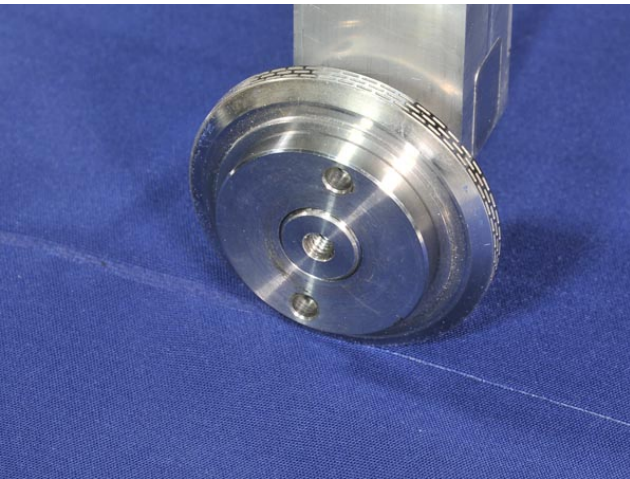
**Horizontally rotating sonotrode and vertically rotating anvil wheel**

20kHz technology

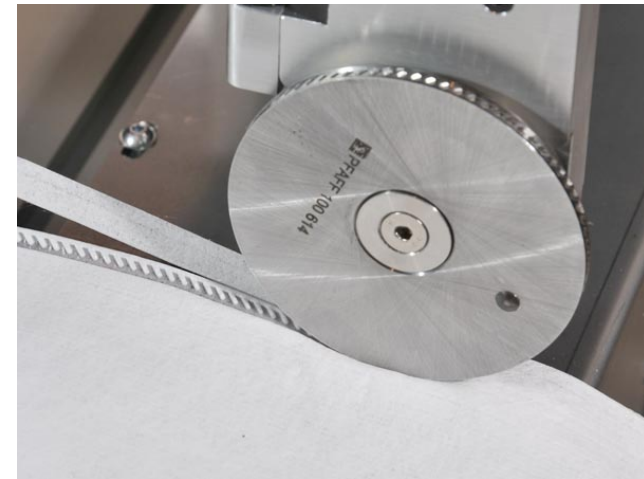
Audible to the human ear  
Potentially noxious effect!

# Available Technologies

## Ultrasonic - Welding Methods



Regular Welding



Cut and Seal

Dual System

Cut and Seal with  
simultaneous  
welding

# Available Technologies *Differences*

<b>Hot Wedge</b>	<b>Hot Air</b>	<b>Ultrasonic</b>
Fabric thickness 0.2mm – 2.0mm	Fabric thickness 0.2mm – 2.0mm	Fabric thickness 0.05mm – 0.4mm
High seam strength	High seam strength	Average seam strength
Welding only	Welding only	Welding only
		Cut and Seal
		Simultaneous Welding and Cut and Seal



# Available Technologies *Pros*

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

# Available Technologies *Cons*

## Hot Wedge

Requires precise setting

Wedge needs to be replaced annually

Cross seams and T-seams difficult

## Hot Air

Comparatively high fume emission (PVC)

Comparatively high noise emission

High air consumption

## Ultrasonic

Processing heavier fabric is difficult

Cross seams and T-seams difficult

# Applications in Apparel Manufacturing

## Seam Sealing:

- **Outdoor Clothing**
- **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**

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ALTERNATIVE!**

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