

Smart Instrument Panel (IP) Board and Knee-Pad made of Natural Fiber Composites

11.-13.09.2207
7th annual SPE Conference
Detroit

Contact for information:

Carl-Heinz FAHNSTER
Natural Fiber Composites
Quadrant Plastic Composites AG
P.O. Box
Hardstrasse 5
CH-5600 Lenzburg 1

Phone +49(0) 6325 9596 230
Fax +49(0) 6325 9596 223
Mobile +49(0)175 240 65 34
e-mail carl-heinz.fahnster@qplas.com

Content

- Introduction
- Material selection
- Raw materials
- Processing of natural fiber composites:
 - Manufacture of natural fiber nonwovens
 - Molding
 - Further processing
- IP board and knee-pad
- View



Smart IP board and knee-pad
made of natural fiber composites



First natural fiber application for IP board and kneepad

Introduction

Standard application for natural fiber composites:

- door bolster
- parcel shelf
- trunk liner
- headliner
- arm rest

New application:

- IP board
- kneepad

Material selection

Possible materials for Instrument panel and kneepad

- Injection molding (PP)
- Natural fiber composites (PP/NF)
Press molding

Material selection

Why used the customer natural fiber composites?

Advantages of natural fiber composites compared with injection molding PP :

- Positive crash behavior (no splintering)
- Lower weight (compared with injection molding)
- Soft touch feeling of the surface
- Advantageous coefficient of thermal expansion
- Reduced Fogging
- Direct laminating realized (one step process)
- Lower invest and process cost (low pressure and one step process)
- Renewable resources
- Natural fibers are CO₂ neutral
- Natural fibers are not bound to raw oil prices

Raw Material

Natural fibers:

Bast fibers (hemp, flax, kenaf, jute)



Raw Material

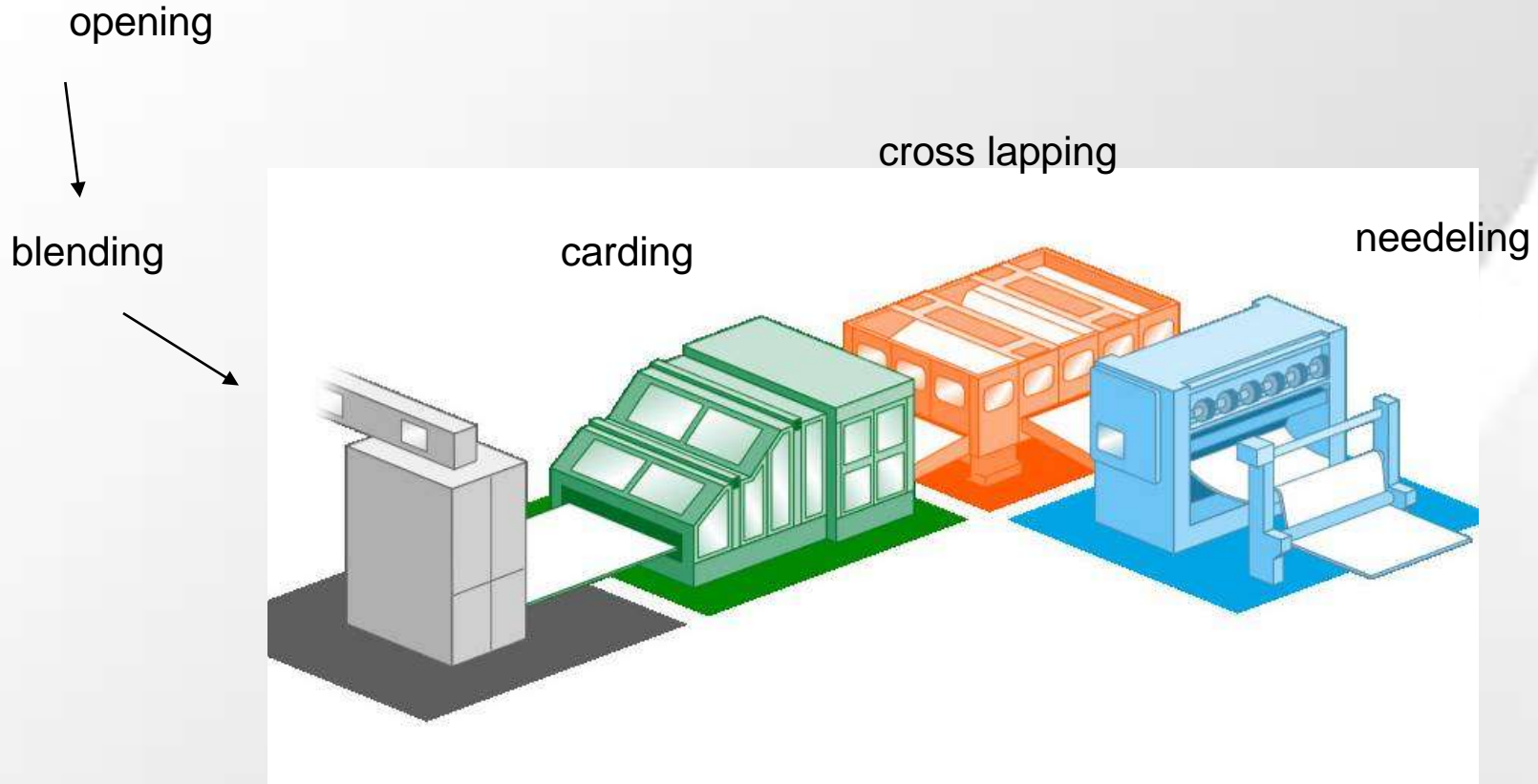
PP staple fiber
as bonding agent

melting point
approx. 165°C



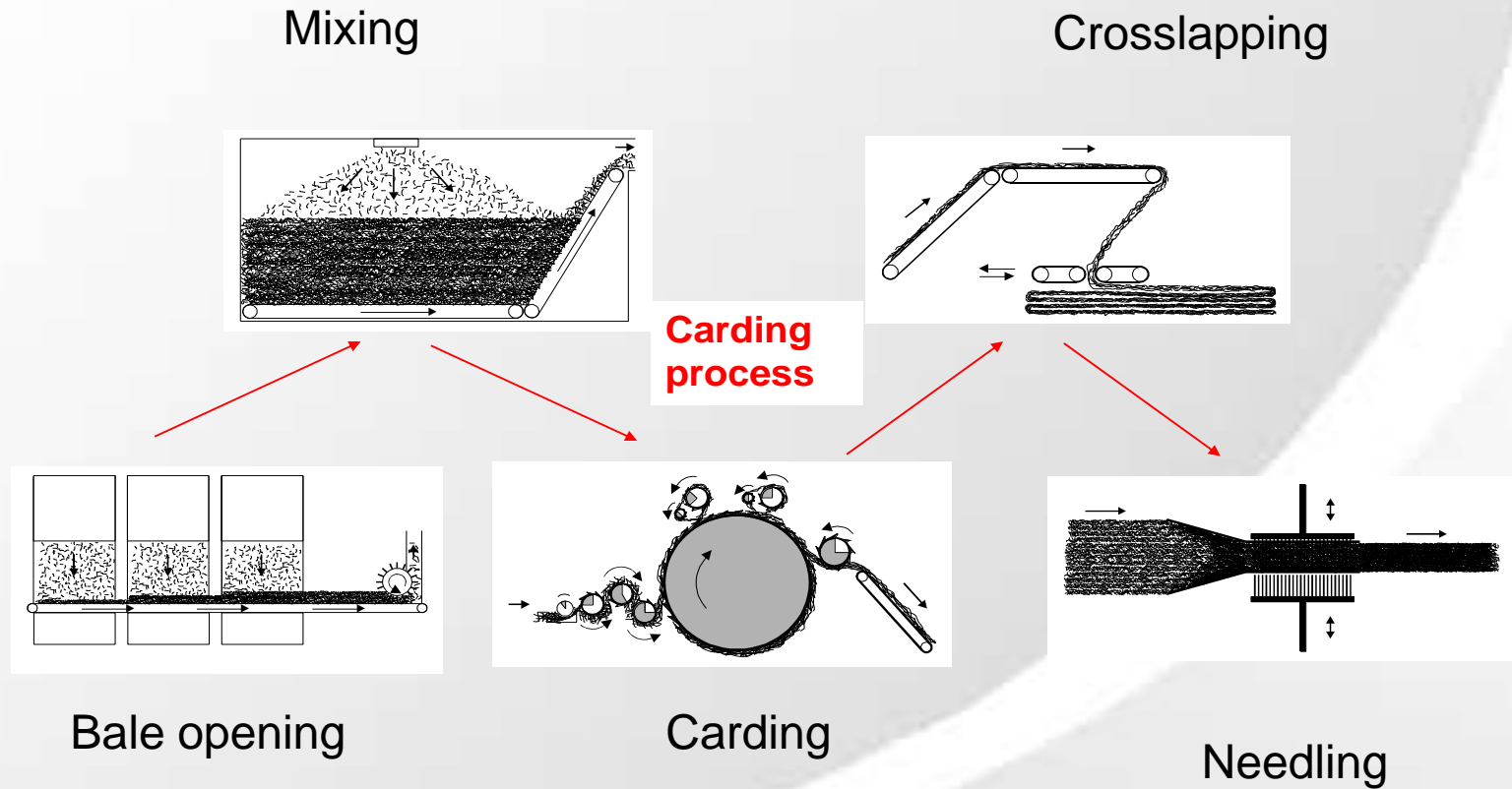
Processing of Natural Fiber Composites

Typical manufacture of natural fiber nonwovens



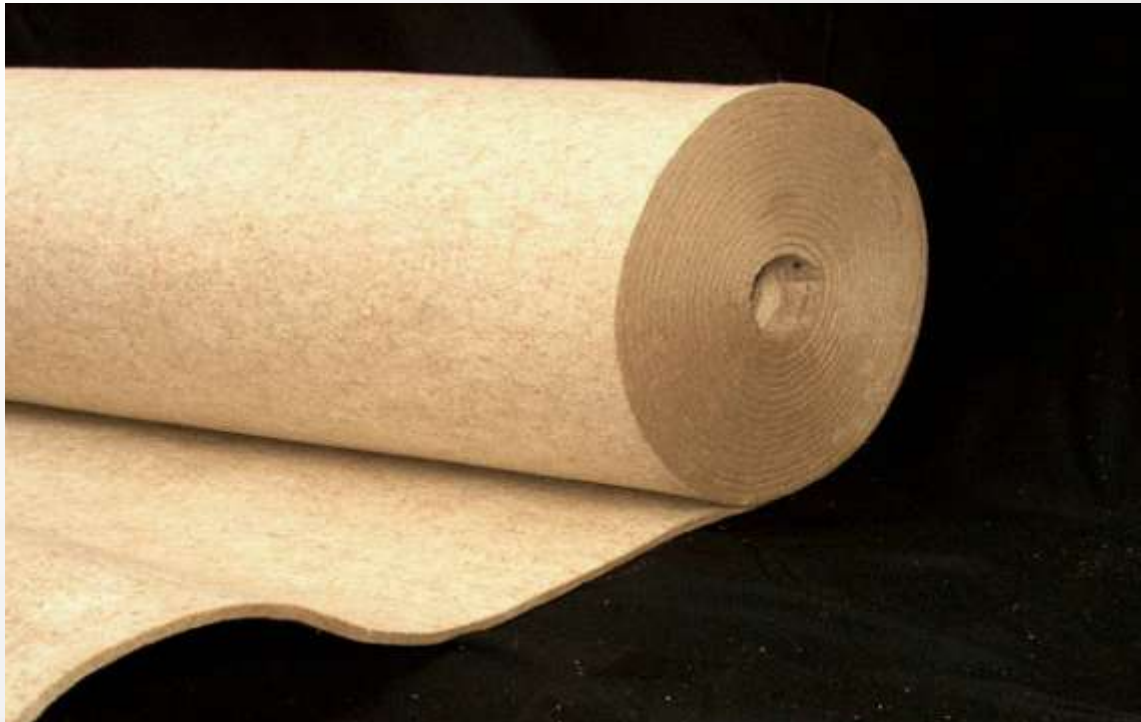
Processing of Natural Fiber Composites

Details of the nonwoven process



Processing of Natural Fiber Composites

Natural fiber nonwoven – single layer



- Nonwoven of Natural- and PP- fibers
- Area weight: approx. 1000 - 2000 g/m²
- Natural fiber content: approx. 50%

Processing of Natural Fiber Composites

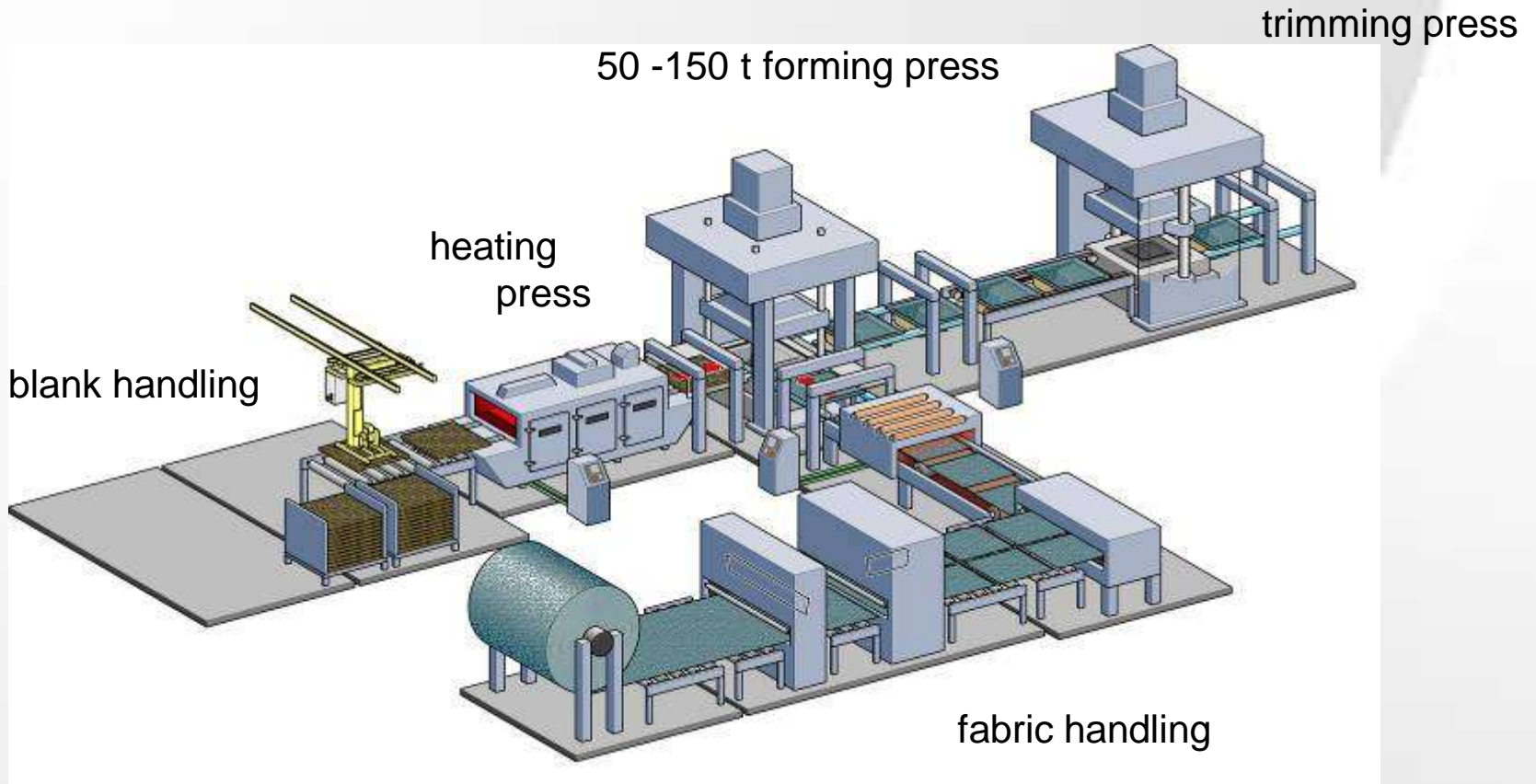
Advantages of natural fiber nonwovens:

- Bast fibers grow on nearly each continent
- Low VOC emissions and fogging
- High flexibility and stability
- Low specific weight of the substrate
- Process waste can be reused
- Excellent 3D deformability
- Reduction of process costs (one step production)
- Short cycle time (45 - 60 seconds per shot)



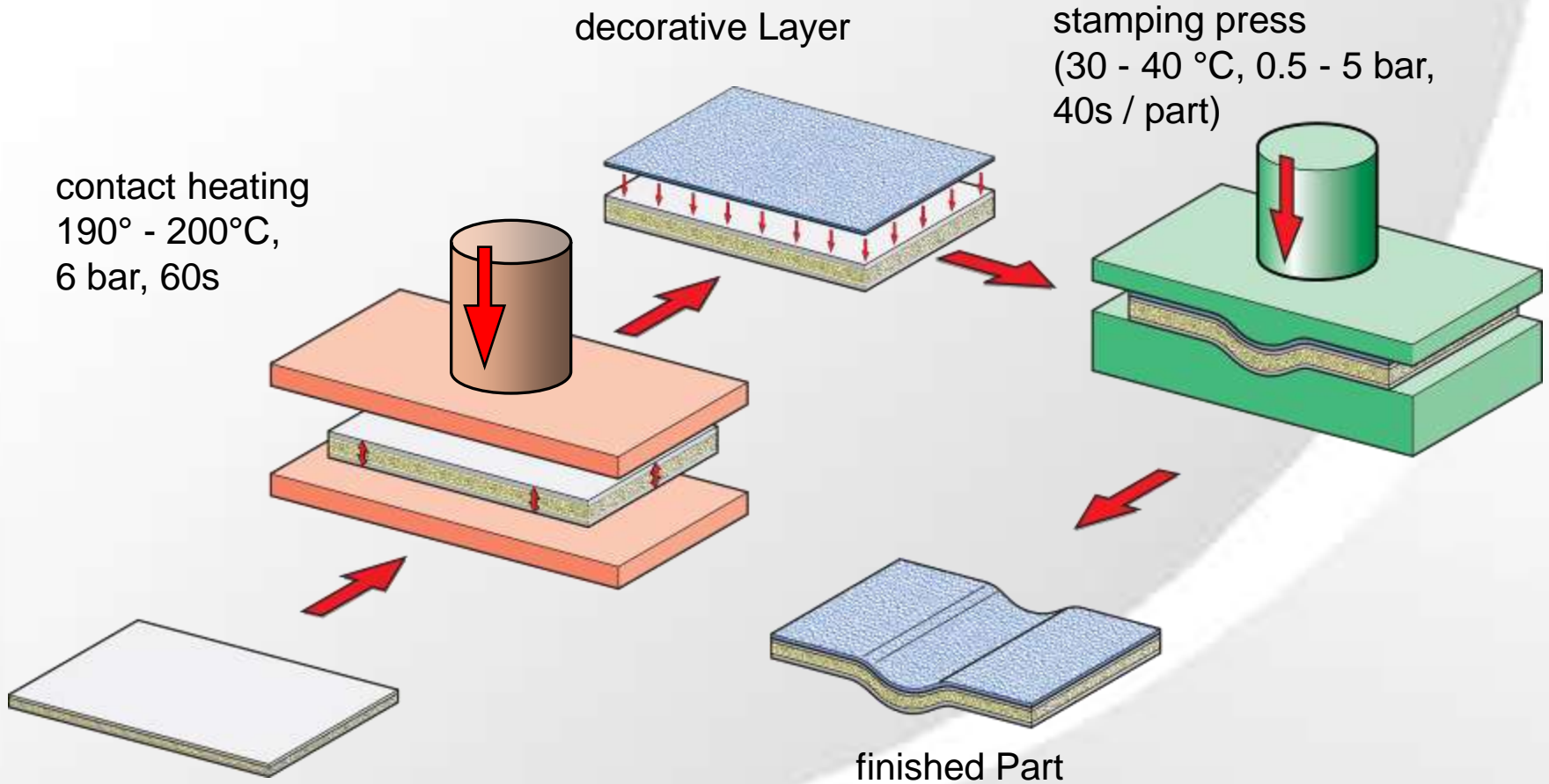
Processing of Natural Fiber Composites

Typical processing line for molding



Processing of Natural Fiber Composites

Details for Molding (One-Step-Process)



Processing of Natural Fiber Composites



Molded part before cutting

Processing of Natural Fiber Composites

Further processing

- Cutting (punching)
- Laser cutting/ water jet cutting
- High frequency welding
- Gluing
- Injection molding of the back side
- Laminating

Processing of Natural Fiber Composites



Cut part

IP Board and Knee-Pad



IP board Smart fortwo

IP Board and Knee-Pad



Kneepad Smart fortwo

View

Future of natural fiber composites

- Increased usage of natural fiber materials for interior parts
- Use of matrix material based on renewable resources
- vehicle weight reduction with natural fibers
- CO₂ reduction with natural fibers (weight, CO₂ neutrality)