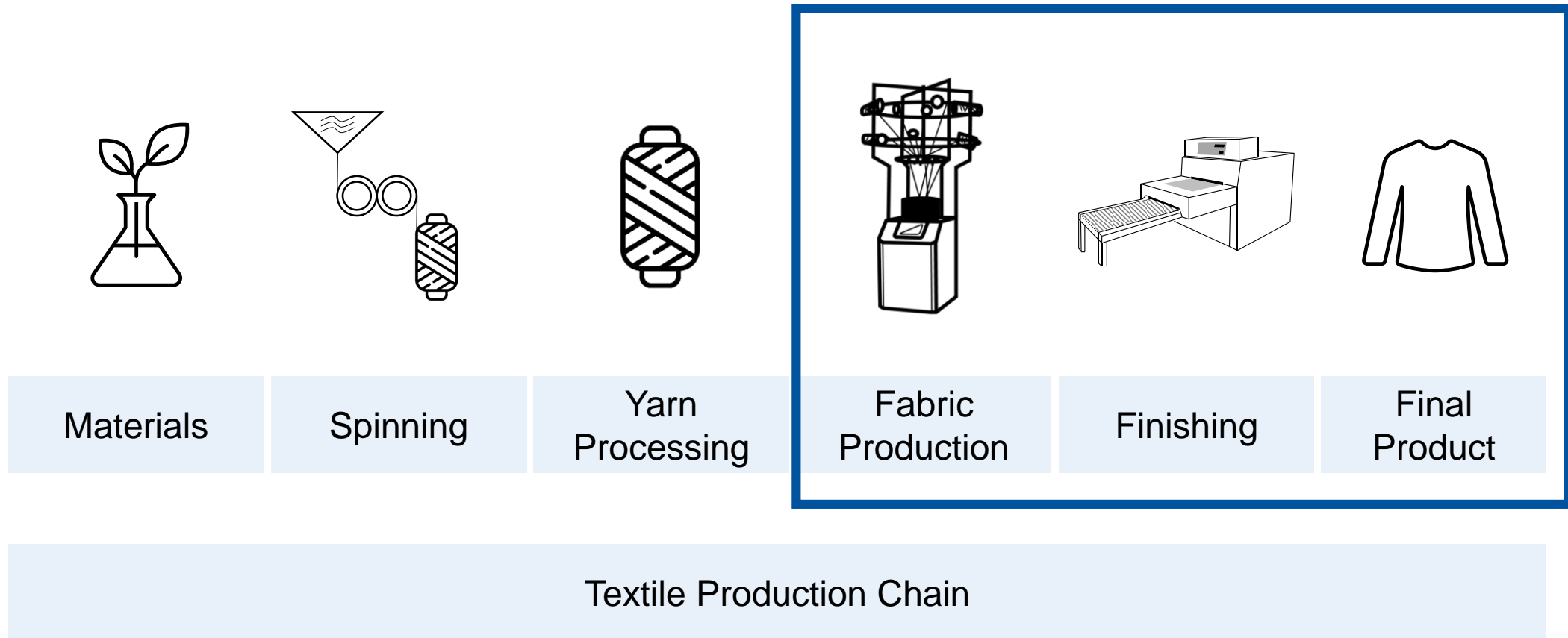




Fabric Production Technologies at ITA

Fabric Production Technologies at ITA

Department Fabric Production



Fabric Production Technologies at ITA

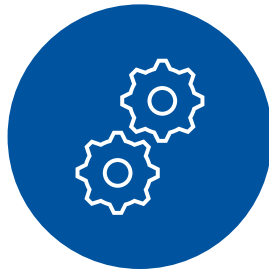
Research Topics

Machinery



Sustainability

Process



Digitalisation

Product



Standardisation

Equipment and Machinery

Weft Knitting

Warp Knitting

Weaving

Finishing

Testing

Weft Knitting Machinery

- Flat Knitting Machine Stoll ADF (E7 – E14)
- Small Circular Knitting Machines
 - Harry Lucas & Merz (E16 – E24)
- Large Circular Knitting Machines
 - Single and Doubly Jersey Machines
 - Jacquard and Mechanical (E12 – E24)
 - Mayer & Cie. and Beck



Flat Knitting



Small Circular Knitting



Large Circular Knitting

Warp Knitting Machinery

- Warp Knitting Machines (E18 – E32)
 - Double bedded Raschel machines
 - Machine with 16 guiding bars
 - Machines with electric pattern mechanism
 - Machine with Jacquard unit
 - Production from creel and warp beam
 - Karl Mayer and Rius Comatex



RIUS Comatex
MiniTronic 808



Karl Mayer DR
16 EEC/EAC



Karl Mayer DJ
6/2 EL

Weaving Machinery

- Air jet weaving machines:
 - Picanol OMNIPlus 800-4-9
 - Width: 190 cm Max. 1.100 U/min
 - Dornier A1
 - Width: 190 cm Max. 1.000 U/min
- Sampling weaving machine:
 - CCI Evergreen II CF 500
 - Production width: up to 500 mm
 - 24 shafts for weaving pattern set-up, 8-color weft selector
- Rapier weaving machines:
 - Picanol Optimaxx
 - Width: 190 cm Max. 250 U/min
 - Bonas MJ3 Jacquard – 4800 Harness threads
 - Dornier PTS 4/SOC10 (Open Reed Weaving)
 - Width: 280 cm Max. 450 U/min
- Tape Weaving machines:
 - Width: 70 – 210 cm
 - Jacquard possible



Air Jet Weaving



Rapier Weaving



Sampling



Jacquard Weaving



Open Reed Weaving



Tape Weaving

Finishing and Processing - Machinery

- Laboratory Heat Setting Machines
 - Free Heat Setting
 - Calender Heat Setting
 - Single Piece Goods
 - Roll Goods
 - Variation of Temperature, Time, Medium and Moisture



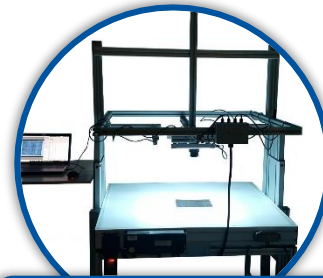
**Free Heat
Setting**



**Calender Heat
Setting**

Testing

- Strain Properties, Air Permeability, Bending Stiffness, Thickness, Martindale test
- Fabric and Filament/Yarn Testing
- Tribology Testing
- Photo-Analysis (REM, CT ...)
 - Lighting Test Table



**Lighting Test
Table**



**Strain
Properties**



Uster Tester

Current Main Research Topics

Current Main Research Topics

Weft Knitting



Material Saving
Production & Sustainable
Textiles



3D Knitting
Flat & Circular Knitting

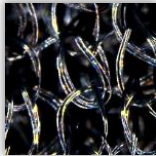


Processing of new
Yarns and Materials

Warp Knitting



Meshes for Large
Deployable Reflectors
(*Space-R-eflector*)



Processing of special
materials (metal, glass etc.)

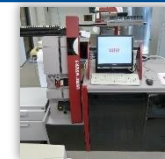
Weaving



Energy Efficient
Weaving Machines



Personal Protection
Equipment

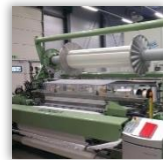


Standardisation of Testing for
Spacer Textiles (*NormATex*)

Processing & Digitalisation



Process and process
data analysis
(Machine Learning)



Digitalisation of Processes
and Production lines



Quality Control and
Failure Detection
(*FIND*)

Example Projects

Fabric Production Technologies at ITA

EU Project CISUFLO

EU-Projekt Circular Sustainable Floor Coverings (CISUFLO)

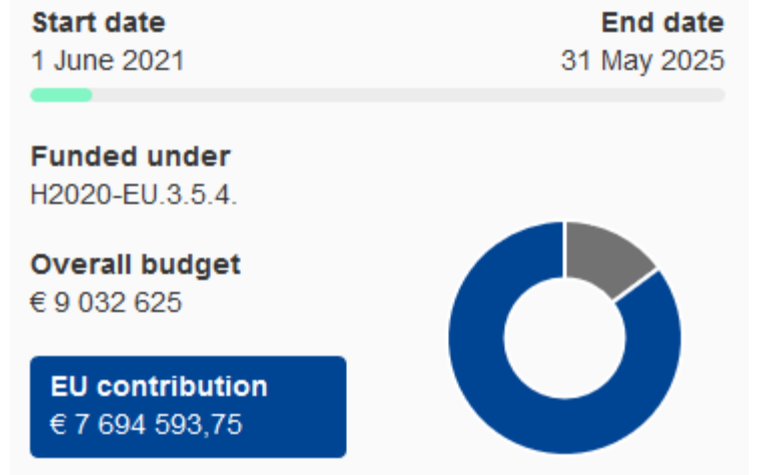
- Tagging along the value chain
- Electronic Passport + Database “ePRODIS”
- “Systemic Transition Support Tool”

<https://cisuflo.eu/>



Input

Output



Fabric Production Technologies at ITA

Kompetenzzentrum Textil vernetzt

- Informieren, Demonstrieren, Qualifizieren, Konzipieren & umsetzen
- "Lernfabrik 4.0 - Digitale Anwendungen in der Praxis erleben"



Fabric Production Technologies at ITA

SpeedFactory and StoreFactory



StoreFactory

Goal



Production of
Sweatshirts in 4h



SpeedFactory



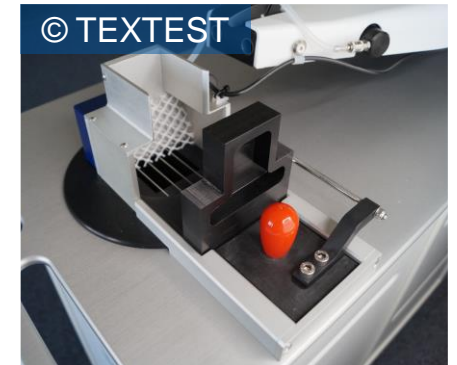
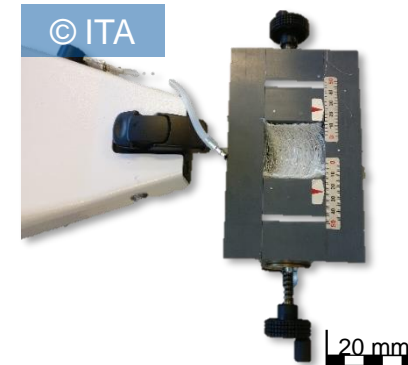
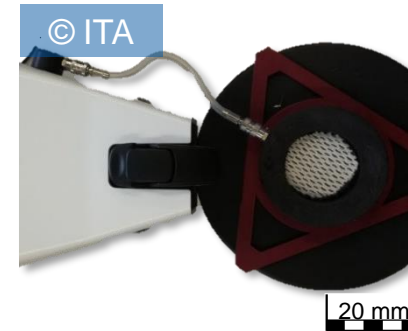
SPEEDFACTORY

Goal

Development of an automated
factory in Germany

NormATex – Standardization of Testing for Spacer Textiles

- Currently mostly testing with "2D" textile or foam standard.
 - Distorts and falsifies results, sometimes destructive for spacer textiles
- Development of new standards and testing equipment:
 - Analysis of deficits
 - Concept development
 - Implementation
 - Validation
- Already developed standards:
 - DIN 60022 Teil 1: Terms and sample preparation
 - DIN 60022 Teil 2: Determination of the air resistance
 - DIN 60022 Teil 3: Determination of thickness



Protection against Molotovcocktails

- Increased risk for police due to increased propensity for violence
- Body armor (KSA) becomes contaminated with fire accelerants
- Protective clothing containing meta-aramid has a high heat shrinkage rate
- Protective clothing shrinks due to high heat shrinkage rate, further increasing heat transfer or exposing body parts



Project goals:

- Reduction of the heat shrinkage from the KSA to max. 1.5 %.
- Development of a test method for the simulation of Molotov cocktail impact

Project approach:

- Modification of the fiber composition of the KSA
- Optimization of the construction of the protective clothing fabric
- Optimization of the finishing of the protective clothing fabric

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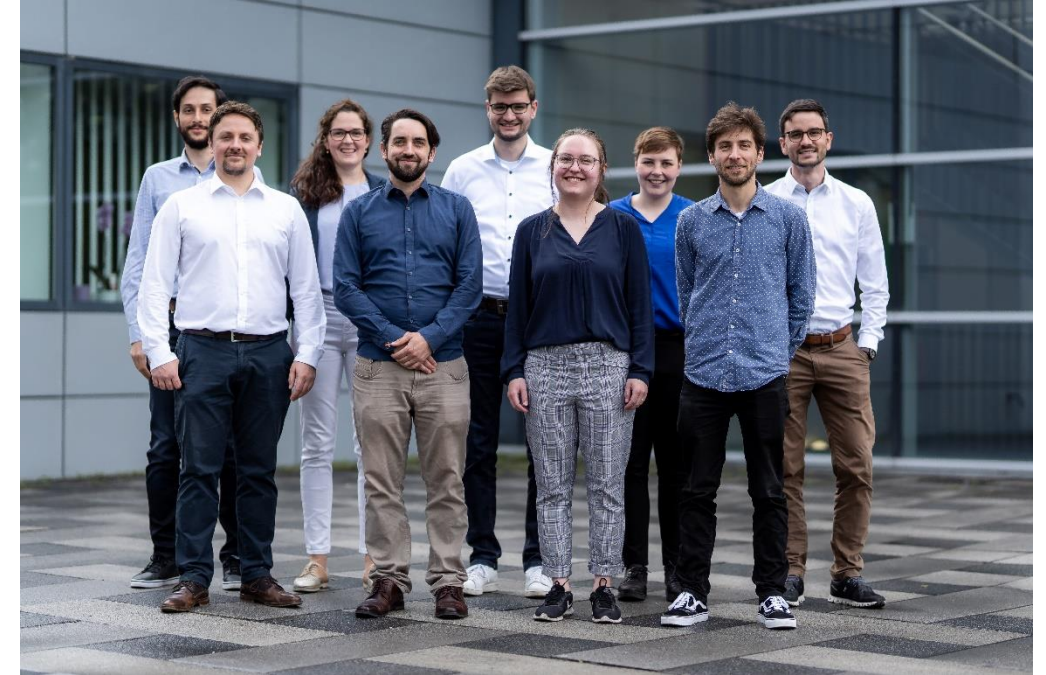
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Thank you for your attention!