Functionalisation of textiles for improvement of fibre/matrix adhesion in thermoplastic composites
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Post processed application of bonding agent on the glass fibre surface

- Post processed application of bonding agent after textile processing to increase mechanical properties in thermoplastic composites
- Functionalisation of the non-crimp fabrics in an immersion bath containing the silane-based bonding agent
- Pure water and ethanol-water mixtures used as solvents with different silane concentrations

Composite panel manufacturing process

- Multilayer designed panel consists of alternating layers of biaxially-oriented glass-fibre fabrics and textile-based polypropylene
- Composite panels manufactured in two step press process containing functionalised textiles
  1st step: Melting of the textile-based polypropylene
  2nd step: Consolidation of the matrix component

Fibre/matrix adhesion by comparison of the mechanical properties according to the silane concentration

- Young’s modulus and tensile strength
- Measuring of mechanical properties to evaluate influence of silane concentration
  - Tensile tests and falling dart tests of specimen from composite panels
  - Reference with untreated textile reinforcement
  - Increase of mechanical properties for higher concentration of a silane-based bonding agent
  - Significant peak at 5% to 7.5% concentration
  - Visible decrease with concentration of 10% silane
  - Mechanical properties at 1.5% and 3% lower than reference
  - Further tests with 7.5% silane concentration in immersion bath
- Penetration energy
  - Functionalised with water (above) and ethanol-water mixture (below) as solvent