

Experimental methods

Equipment:

Friction tester at University of Twente mounted with a 1 kN loadcell.

Ply-ply friction tests on friction tester with C/PEEK:

1. Various sliding velocities (denoted as shear in 'Specimens.pdf' document)
2. Stop & go experiments at constant velocity of 25 mm/min:
 - First shearing action up to ~7.5 mm displacement
 - Wait for certain rest time, then continue shearing action at same velocity (second peak)

Ply-ply friction test procedure:

- Check if pressure plates are parallel (adjustable through the springs with bolts)
- Intrinsic stiffness:
 - Bring the pressure blocks together up to spacing of around the specimen thickness by applying pressure: normal force measured is the correction value to be used as a correction factor to determine the actual pressure applied on a specimen during a real test.
- Sample preparation:
 - Two metal foils (120 mm x 55 mm), cleaned with isopropanol
 - Sample material (50 mm width), raw material, overlap region: 65 mm (see figure in ESAFORM 2021 conference paper).
 - Metal foil at both sides of specimen to protect the pressure plates.
- Check displacement sensor (straightness (laser light) and proper working in range of interest)
- Mounting specimen: middle ply clamped in upper clamp (removed from tensile tester for convenience). Alignment check of the specimen w.r.t. the upper clamp using a laser light. Upper clamp reassembled in universal testing machine and crosshead moved downwards to mount the outer plies (with the metal foils) in the bottom clamp, first tightened by hand. Logging started and paperclips were removed from specimen. Application of normal pressure, followed by firmly tightening of the bottom clamp as well.
- A certain waiting time was used before starting the test (5 min).
- After testing: normal pressure removed and bottom fixture untightened
 - Data logging continued: force recording while specimens hangs at upper clamp used for correction of pulling force (zero the force).