

“So test therefore, ...”

So test therefore, who join forever!

According to this wise old saying also coatings, adhesive-bonded joints and composite materials should be tested in advance regarding adhesive, bonding or composite strength.

Until now, these experiments have been time-consuming single-sample tests within a **tensile testing machine**. A two-sided sample clamping and a double-cardanic suspension are usually required.

Nowadays, the **centrifuge test** is the „up-to-date“ testing procedure.

Similar to a merry-go-round with a drum rotor, the effect of centrifugal force is utilized. In case of the centrifuge test, the centrifugal force is used for testing of composite strength. It is advantageous that samples are simply plugged in instead of a two-sided sample clamping.

As a result, up to eight samples can be tested under identical conditions at the same time.

The presence of shear force at bonding and testing is avoided by means of guiding sleeves functioning as both sample support and test stamp guidance. Test stamps acting as mass bodies are bonded either on the coated substrate or the counter-body.

The entire test specimen assembly is simply plugged in in sockets of the drum rotor of the centrifuge.

After closing the drum rotor, the centrifuge lid is lowered and locked.

The testing sequence is started.

The eight „black discs“ indicate equipped rotor positions with intact test specimen assemblies.

The drum rotor is accelerated according to the pre-selected testing sequence. Rotational speed and the effect of centrifugal force on the test stamp respectively on the test specimen assembly are increasing.

For the critical load at rupture, the assembly fails. There are four fundamental failure pattern:

- failure at the interface test stamp and adhesive
- failure within the adhesive
- failure at the interface adhesive and coating
- failure at the interface coating and substrate

In the following, the test stamp moves outwards triggering the rupture detection unit. The „black disc“ of a certain rotor position converts into a „white circle“.

The testing sequence continues as long as all assemblies are separated or maximum rotational speed is reached.

Then, rotational speed is decreased down to zero.

After standstill of the rotor and opening of the rotor lid, samples can be removed.

The entire testing procedure takes not even five minutes loading and unloading of eight samples included.

Subsequent to testing fracture areas are investigated using a microscope and assigned to failure pattern.

So test therefore, what join forever!