

Textechno
textile testing technology

DYNAFIL

Dynamic Thermal Analyzers





Dynamic Thermal Analyzers DYNAFIL

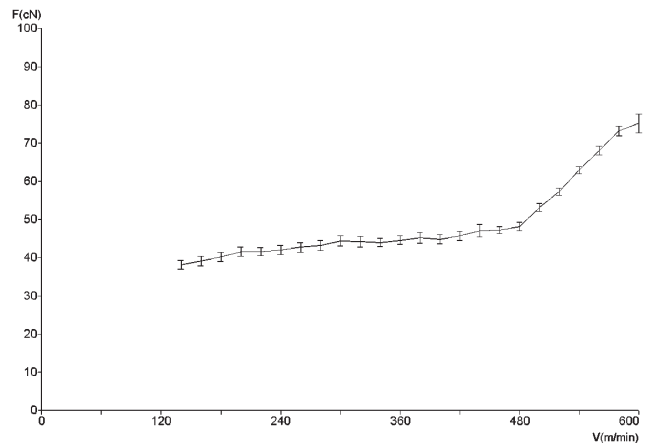
In 1973, Textechno supplied the first DYNAFIL testers, thus laying the foundation for a new era in **thermomechanical testing on running yarn**. Since then, this test method has constantly and strongly increased its share of the quality control methods applied to synthetic filament yarns.

The basic principle of such tests concerns the transport of a yarn through a heating zone situated between two feed mechanisms, where either yarn tension at constant overfeed or extension / contraction at constant tension are continuously measured.

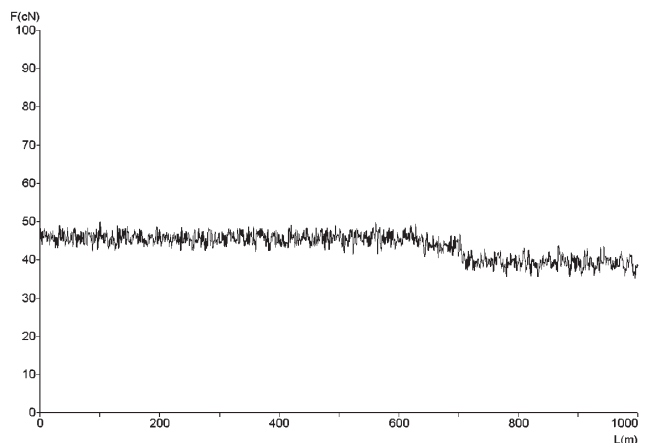
The DYNAFIL was initially developed for testing textured yarns but, at a later stage, also proved to be a breakthrough in the testing of POY for quality assurance purposes in the spinning of filament yarn.

To-date, the most important application areas for thermomechanical tests on running yarns are:

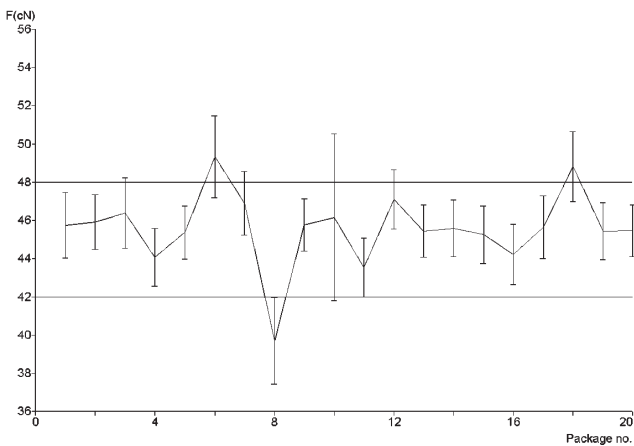
- Draw-force tests on undrawn, pre-orientated or fully-drawn yarns;
- Crimp or crimp-force tests on textured yarns; as well as
- Shrinkage- or shrinkage force tests on all yarn types.



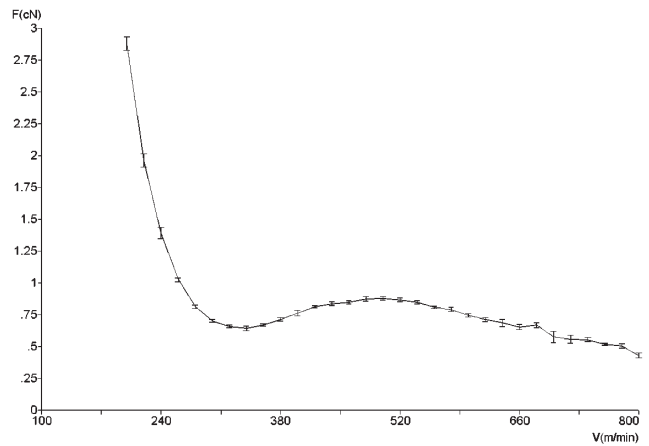
Draw-force versus test speed diagram of Polyester POY 290 dtex, automatically recorded.
Heater temperature 400 °C, extension 60 %.



Draw-force versus yarn test length diagram of Polyester POY 290 dtex; 400 °C, 60 %, 400m / min.



Results of draw-force tests - mean values, standard deviations and acceptance limits - for 20 packages Polyester POY 290 dtex.

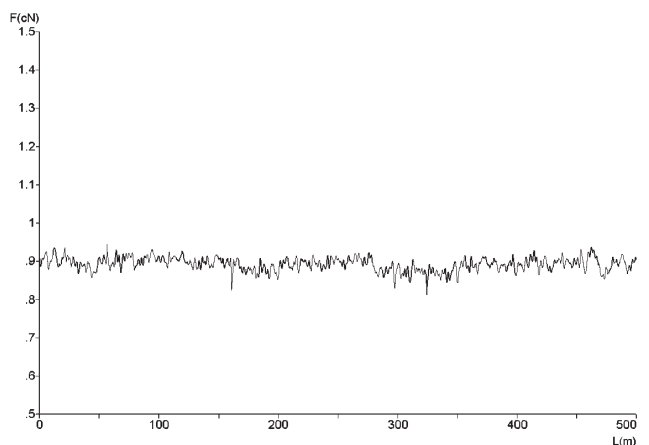


Shrinkage- and crimp-force versus test speed diagram of textured Polyester yarn 167 dtex. Heater temperature 400 °C, overfeed 5 %.

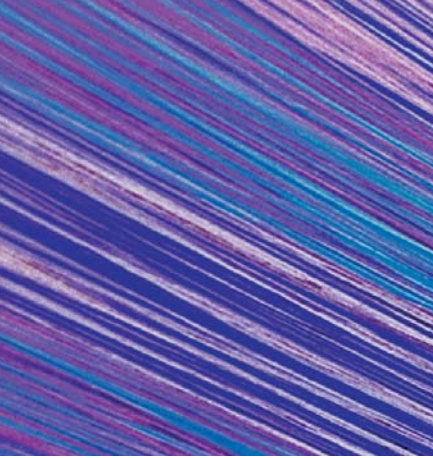
Such tests aim to detect package-to-package variation and exceedings of preset acceptance limits. Moreover, they serve to identify non-uniformity within a package.

Based on these test results, variations or disturbances during the production process become apparent at an early stage, enabling prompt remedial action.

By setting aside faulty packages, associated problems during subsequent processing and quality downgrades of the intermediate or final products can be eliminated. Alternatively, there is a possibility to segregate yarns that have properties deviating from the norm and obtain a perfect quality through appropriate changes to subsequent process conditions, e.g. draw-ratio in the texturing of POY.



Crimp-force versus yarn test length diagram of textured Polyester yarn 167 dtex; 400 °C, 5 %, 520 m / min.



DYNAFIL ME

The newest evolutionary stage in the Textechno DYNAFIL series is the DYNAFIL ME. Apart from a substantial increase in output, the DYNAFIL ME is also characterised by a high degree of automation and is especially user friendly. Moreover, it opens completely new areas of application for filament yarn testing. In the past all DYNAFIL models worked with constant overfeed / extension. In addition to this, DYNAFIL ME also enables measurement of extension or contraction at constant tensile force, e.g. percentage crimp contraction of textured yarns. Furthermore, it is possible to carry out time-dependent shrinkage- and shrinkage force measurements and relaxation- or creep tests on static yarn.

The DYNAFIL ME incorporates a patented **high temperature heater** that operates between room temperature and 500 °C. In conjunction with godet yarn feed mechanisms and electronically regulated servo drives, it enables test speeds of up to **1000 m / min**, which have until now been impossible to realise. Furthermore, it opens new application possibilities in the area of high temperature resistant polymers. A further technical innovation is the **high-resolution load cell** for highly accurate measurement of even the smallest forces, e.g. for crimp tests on textured yarns.

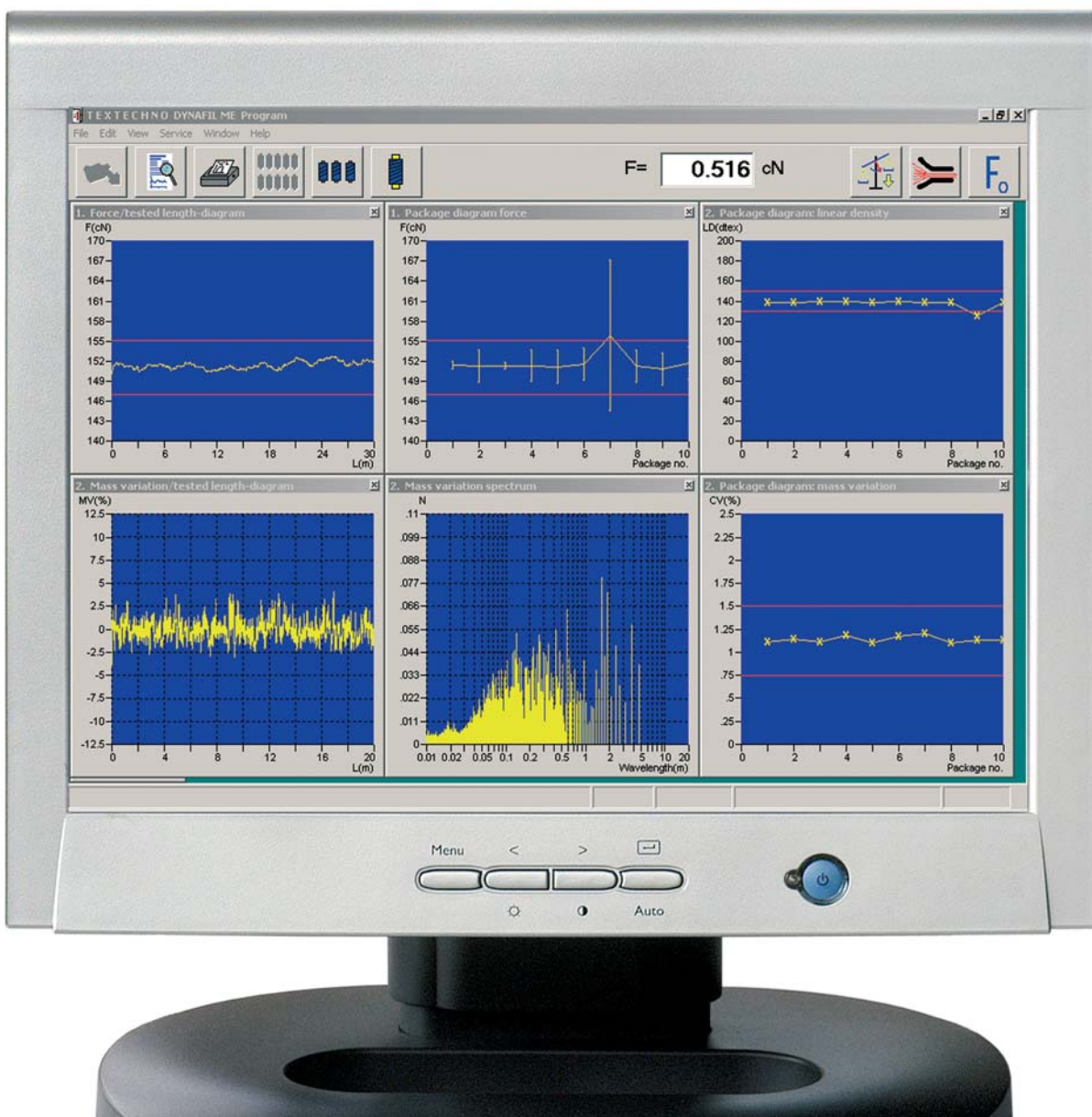
Apart from standard tests for routine quality control, the PC control technique also permits the use of complex test parameter linkages, which allow for substantially more comprehensive statements to

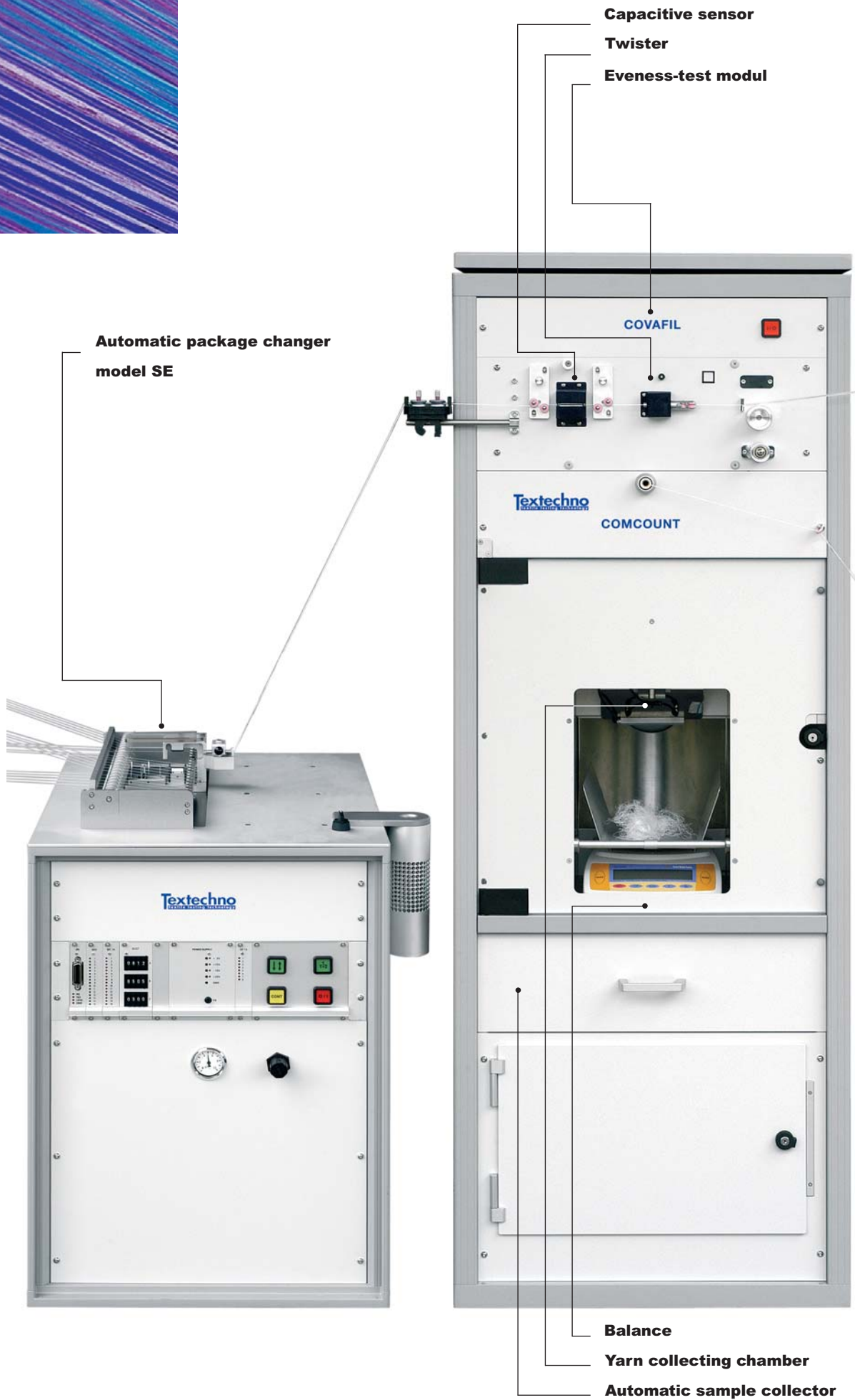
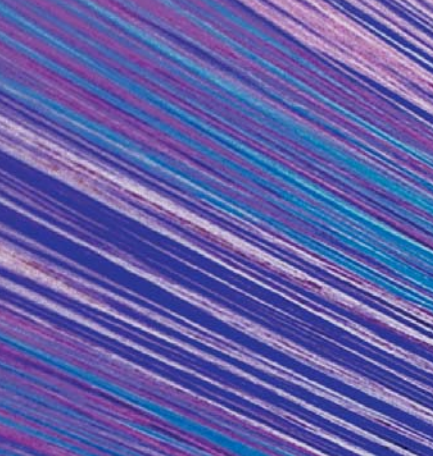
be made concerning yarn quality and sources of faults during production. Detailed investigations have demonstrated that DYNAFIL tests that have been configured accordingly can often replace work intensive knit-dye tests that are commonly used in texturing. A change of test material, yarn count, or testing method is PC controlled and requires no manual adjustment to the test equipment.

In addition to the actual DYNAFIL testing methods, the application areas of the equipment can be substantially broadened to include **friction measurements, entanglement tests, yarn evenness tests** and **yarn count measurements** using additional modules. Here, the basic principle of all such additional tests is that, in each case, they take place either simultaneously or sequentially on the same yarn. As a result, there is a substantial time advantage over the use of several different test instruments and significant advantage in space saving, together with increased functional safety. At the end of the testing sequence, the yarn samples can be captured by an **automatic sample collector** and be forwarded for further testing, e.g. for determining spin finish- or coning oil contents.

To achieve a high test output, an automatic changer for feeding the test packages is recommended. The Textechno **package changers model SM** and **SE** for feeding 2 or 20 yarn ends respectively

operate on the principle of splicing the running yarn. This method enables package change without stoppage of the test equipment during the package changeover.





Pretensioning device

Friction device

Intake godet

Nip roll

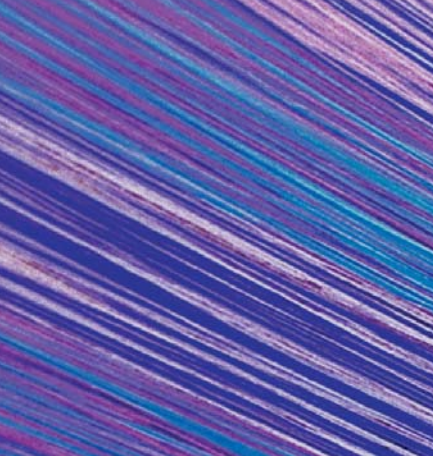
Heater



Take-off godet

Entanglement-test sensor





Testing methods

- Draw-force testing of pre-oriented yarns (POY), e.g. according to ASTM D 5344 – 99, or of fully-drawn yarns (FOY, FDY);
- Crimp testing of textured yarns (DTY, BCF);
- Shrinkage testing of all types of yarns;
- Static shrinkage-, relaxation- or creep measurements;
- Friction measurements*;
- Entanglement tests*;
- Capacitive evenness tests*;
- Yarn count testing* with sample collection*.

System components

DYNAFIL ME, basic equipment

Yarn feeds:

- 2 godets, alternatively nip rolls can be automatically added,
- computer controlled servo drives for yarn speeds up to 1000 m/min;
- Pre-selectable extension -80 – 1000 %;
- Gauge length between the godets 1250 mm.

Heater:

- Electrically heated, max. temperature 500 °C (special model for 600 °C if required), length 1000 mm, automatic traversing for yarn introduction to the heater.

*with additional modules

Force measuring system:

- 1 load cell with measuring roller, nominal range 1200 cN, resolution 10 µN;
- Automatic yarn lift and calibration.

Pre-tensioning device:

- KTF active feeding device, PC controlled, for obtaining accurately adjustable and constant pre-tension forces within the range 1 – 1000 cN; two easily exchangeable load cells (100 cN and 1000 cN) available.

TESTCONTROL:

- PC system for controlling the test processes and for the evaluation of the measured data, connected via Textechno interface;
- Textechno software as a WINDOWS application;
- Input of all parameters for testing and measured data evaluation on the PC, saving of selected parameter sets of test conditions under code words;
- PC easily integrated into any network type.

Additional modules

Friction device:

- With ceramic- or stainless steel friction bodies (other surfaces on request);
- Choice between three different, automatically adjustable wrap angles.



Entanglement sensor:

- Optical determination of yarn diameter;
- Fully automatic adjustment to the yarn count;
- Adjustment to existing value levels via adjustable threshold value;
- Max. test speed 1000 m/min;
- Measuring heads for fine and medium count yarns (up to 2500 dtex) and coarse yarns (over 2500 dtex).

Module for measuring yarn evenness COVAFIL:

- Capacitive measuring system, yarn count range 50 - 300 dtex (other ranges on request);
- False twist rotor up to 14000 rpm;
- Integrated yarn feed system for stand-alone use, independent of the DYNAFIL ME.

COMCOUNT:

- Yarn collecting and weighing device, weighing range 0 – 310 g, resolution 1 mg.

Automatic sample collector:

- Takes over the weighed samples from the COMCOUNT module;
- Exchangeable magazine with 20 collecting positions.

Package changer:

- Automatic change by splicing the running yarn;
- Model SE for 20 yarn ends;
- Model SM for 2 yarn ends.



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