Brugger
MÜNCHEN

KFT-C
Flex Durability Tester

The Flex Durability Tester simulates stress, which flexible packaging materials (such as coated or vapor-coated paper, plastic films and laminated material) may be subject during the automated packaging process. The KFT-C covers the determination of the flex resistance of flexible barrier materials with a high repeatability. In most cases the flexing action consists of two movement parts: First a twisting motion and a horizontal motion simultaneously, followed second by a horizontal motion only. The length of the horizontal motion, the angle of the twisting motion and the numbers of cycles are defined in the ASTM F 392-93 standard. This standard describes five testing different conditions which can be all simply set by a selector switch on the KFT-C. Additionally the operator can choose any desired numbers of cycles.
After the test, any failure of the barrier can be determined by a gas permeability test (using our GDP-C tester) and/or by a water permeability test (using our WDDG tester). Physical holes through the material can be detected by the colored-turpentine-pinhole test.

Our KFT-C prove successful in the following applications:

- Inline quality control: Reliable information regarding the quality standard
- R & D: Determining the flex durability of new film types

KFT-C Features

- **Specimen preparation according to international standards:** The KFT-C is in according to the ASTM F 392-93 standard.
- **High reproducibility:** Exactly the same stress simulations for all specimens, guarantees a high reproducibility for the following tests.
- **Easy handling:** One selector switch for all testing conditions in accordance to the ASTM F 392-93.
- **Test stops automatically:** The running preconditioning stops after the set numbers of cycles had been reached.

- **Enhanced testing conditions:** Using customized numbers of cycles – from 1 up to 999999 - the specimen's preparation can be adapted to the customer's special needs.
- **Long lifetime:** High-quality manufacturing guarantees an extended longevity.
- **Health and safety:** Interlock and safety cover reduce the risk of injury during the specimen preparation.
- **Future:** The device meets the increasing QC requirements of the packaging industry.

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Principe

The device uses a stationary and a movable mandrel of 90 mm diameter each. The specimen is affixed between the two mandrels in the shape of a cylinder. To do this, both ends of the specimen will be affixed with a locking onto each mandrel. In this initial position, the distance between the mandrels is approx. 180 mm (face to face).

Two different motion cycles are described in the ASTM F 392-93 standard: One motion cycle uses a twisting angle of 400° and a horizontal move of 80 mm simultaneously (short stroke). The other motion cycle uses a twisting angle of 440° and a horizontal move of 90 mm simultaneously, followed by a single horizontal movement of 65 mm without twisting (long stroke). The frequency for both motion cycles is at a rate of approximately 45 cpm.

A logic module interprets the information from 7 different contactless switching sensors and controls the valves for both pneumatic linear actuators. Using the selector switch, the 5 different standard testing conditions can be set. Additionally the operator can choose any desired numbers of cycles for both different types of motion cycles. The actual testing condition is shown in the LCD-display on the logic module. During a running test the current number of cycles is also indicated in this LCD-display.

Examination

For further analysis cut a suitable piece out of the stressed specimen. Now you have different options to analyze the results of the flex test performed.

If you are testing unknown specimens or specimens with a low flex resistance you can analyze the degree of damage by a porosity test in a first step. So you can determine physical holes through the material by a colored-turpentine-pinhole test. Another option is to find pores and pin holes using a microscope.

If the damage caused by the flexing stress is not visible, or if you wish to analyze the flex resistance of thin barrier layers, it is necessary to make a gas or water vapour transmission test. Our company also provides suitable testers for this purpose (Gas Permeability Tester type GDP-C and Water Vapour Permeability Tester type WDDG). You get a high reliable result regarding the flex resistance by comparing the results of the permeation tests before and after the flex durability test.

Technical Data

Testing Standard	Reproducible simulation of mechanical stress to determine the flex durability on films in accordance to the ASTM F 392-93 standard
Specimen dimension	DIN A4 / 210 mm x 295 mm
Compressive strain (long stroke)	155 mm
Compressive strain (short stroke)	80 mm
Angle of twist (long stroke)	440° (the first 90mm during the compressive strain)
Angle of twist (short stroke)	400° (during the complete 80mm compressive strain)
Testing conditions according the ASTM F 392-93 standard	Condition A: long stroke / 2700 Cycles Condition B: long stroke / 900 Cycles Condition C: long stroke / 270 Cycles Condition D: long stroke / 20 Cycles Condition E: short stroke / 20 Cycles
Additional testing conditions	long stroke / 1 up to 999999 Cycles short stroke / 1 up to 999999 Cycles
Stroke frequency	approximately 45 per minute
Dimensions	69 x 27 x 30 cm
Weight	27.5 kg
Storage temperature	10°C - 40°C
Operating temperature	15°C - 35°C
Relative humidity	80% maximum, not condensing
Compressed air supply	5 bar up to 10 bar
Electrical connection	100 - 240 V/50 - 60 Hz, Current maximum 1,5 A primary / 24 V DC, max. 1,88 A secondary