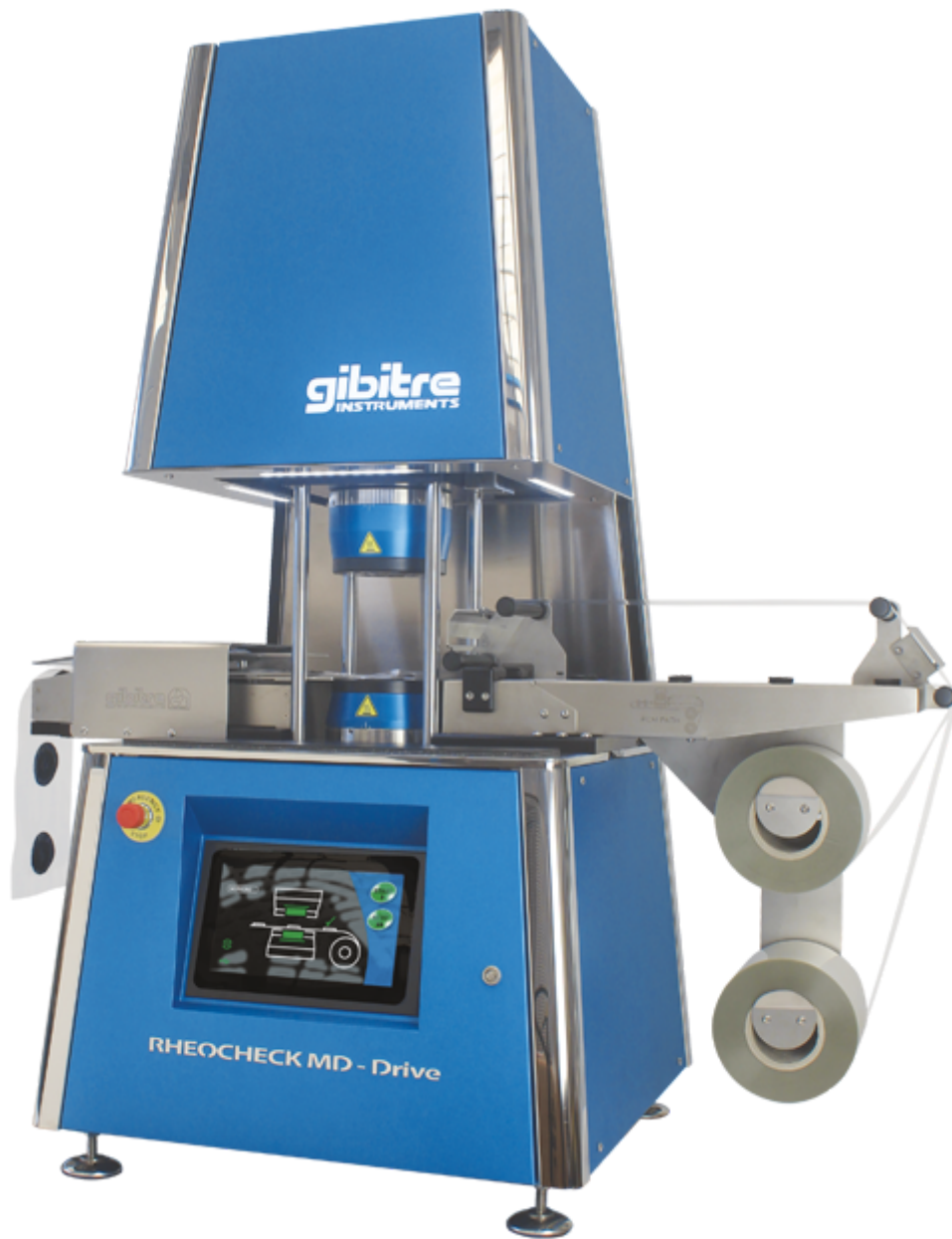


# RHEOCHECK MD - DRIVE

MOVING DIE RHEOMETER CONTROLLED BY PERSONAL COMPUTER.



**gibitre**<sup>®</sup>  
INSTRUMENTS

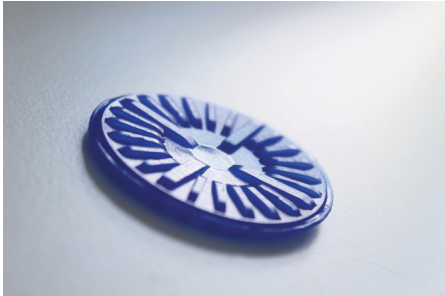
## Standards the instrument complies with:

ASTM D5289; ISO 6502-1; ISO 6502-3;

### Overview

The Rheocheck MD - Drive measures the cure characteristics of a rubber compound in conformity with the international standards ISO 6502-3 and ASTM D 5289.

The measure of the vulcanization is carried out by measuring the modification in the mechanical characteristics of the sample. The instrument permits to apply a cyclic strain to a test piece and to measure the associated force. The test is performed at a defined temperature and the measure of stiffness recorded continuously as a function of time.



### Why choose Rheocheck MD - Drive?

- Totally developed and produced in Italy
- Top brand Components
- Sealed testing chamber
- Exclusive construction for the micrometric adjustment of the gap between the dies
- Independent temperature controllers with 0.1°C resolution
- Compressed air cooling circuit for rapid temperature adjustment
- Touch-screen display for instrument control
- Full license of Rheocheck\_10 software optimized for Bar-code sample identification
- Full license of Datagest\_10 software for complete management of Gibitre SQL Database



### The new 'Drive' generation

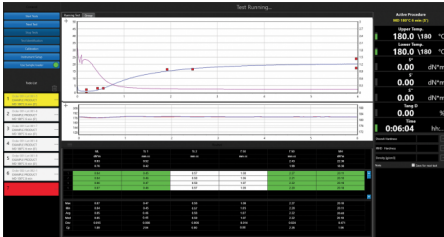
The new generation of 'Drive' instruments is the result of 40 years of experience in the measurement of rheology of rubber and incorporates the most modern technologies regarding mechanical construction, measurement sensors and control software. Have a look at the movie.

## RheoCheck\_10 Software

The RheoCheck\_10 program connects to the Gibitre SQL database and allows you to collect all the results within the Datagest data management program.

The program allows you to:

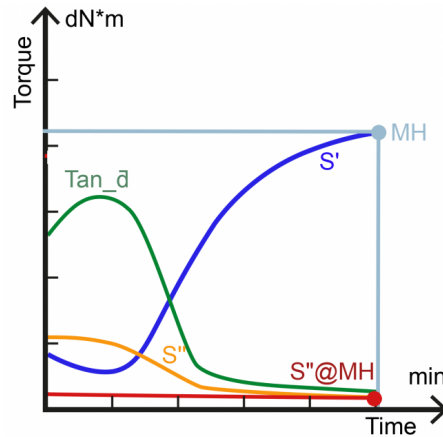
- Quickly identify the sequence of tests to be performed
- Automatically adjust the instrument according to the required test conditions
- Analyze the Test curves ( $S'$ ,  $S''$ ,  $S^*$ ,  $Tan\_delta$ ,  $Der(S')$ , Temperatures of the dies)
- Compare the results with the tolerance limits
- Elaborate statistical analysis (Carta-X, Gaussiana, Media, Dev St., Max, Min, Cp, Cpk)
- Produce customized reports
- Store Results and Curves to SQL database
- Export data with custom format



## Calculated Results

The software allows you to prepare customized test procedures that include all the calculations required by the standards and product specifications.

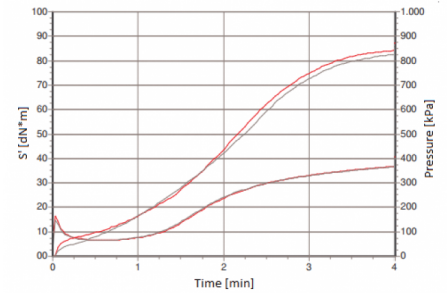
The dedicated page describes all the available calculations.



## Pressure control

The instrument can be optionally equipped with a pressure sensor for the testing of the expansion evolution of the sample during the curing.

This option is useful for the analysis of cellular rubber formulations.

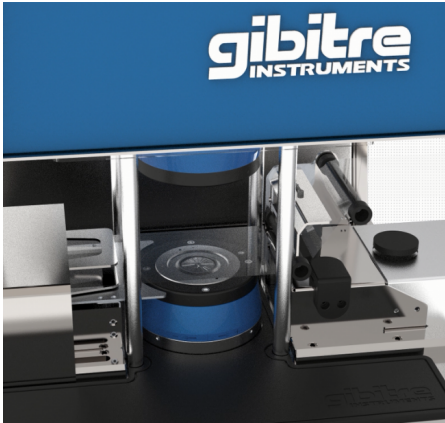


### Automatic sample loader

The device allows to position 5 test pieces on the loading slide and automatically perform the tests on all the samples.

Before starting a test, the software automatically regulates the instrument according to the test conditions required for the next sample in the queue.

When the test conditions are within the expected tolerance limits, the sample loader moves the sample in the right position and starts the test.

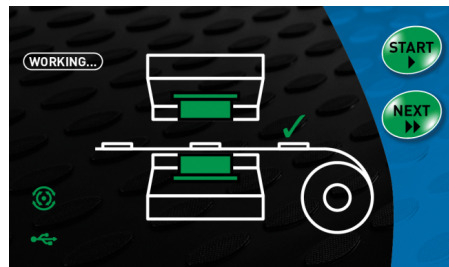


### Instrument Control Panel

The instrument is equipped with a large touch-screen display with dimensions 10.2".

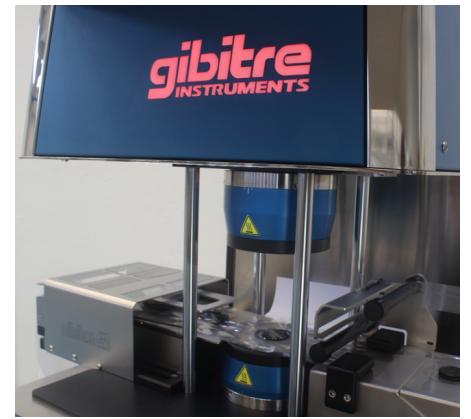
The buttons on the display permit to start and stop the tests.

The display provides complete information about the status of the instrument: connection to the software, temperature of the dies, diagnostic of the sensors installed.



### Light panel

A light panel, installed in the front part of the instrument, changes the color and permits to check the status of the instrument from a distance. The indicator light identifies the following statuses: Instrument ready, instrument under test, instrument setting test temperature, no specimen in the queue (with autoloader).





## Test dies

Pressurized test chamber conforming to the international standards.

Specifically designed Low-friction and Long-Life seals permit to perform up to 10.000 tests and minimize maintenance needs.

The micrometric adjustment of the distance between the chambers is carried out independently by the exclusive mechanical adjustment vernier. The device allows you to easily adjust the thickness of the specimen to meet the requirements of ISO 6502-3. The thermal insulators, used to avoid heat transmission, have been chosen for their excellent mechanical characteristics and low thermal conductivity.

The insulators are coated with a surface treatment based on fluorinated polymers, which ensures extremely high resistance to chemical agents and ease of cleaning.

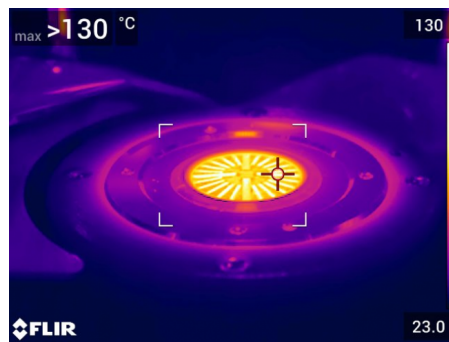


## Temperature regulation

The regulation of the temperature is performed using thermo-regulators with PID micro-processor and with 0.1°C resolution.

Independent temperature control units ensure sophisticated temperature control and easy replacement in case of failure. Electrical heating resistances have been specifically designed for this instrument to ensure quick and efficient heating.

The test chambers are equipped with a compressed air cooling circuit, controlled by the temperature control units, which allows rapid temperature reduction.



## Torque Calibrator Supplied

The supplied torque calibrator allows the user to periodically check the torque reading of the instrument.

The calibration wizard inside the software:

- Requires the insertion of the calibrator between the instrument surfaces
- Waits for the thermal conditioning of the instrument
- Performs the comparison between the instrument measurement and the calibrator torque value
- Requires removal of the calibrator after verification

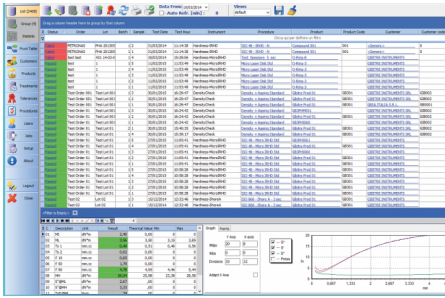


## Datagest program: total Traceability

The Datagest program is the Database Management Tool always installed in combination with all Gibitre instrument-control programs.

The program permits to:

- Select, filter, print, export and analyse the test results stored with all the instruments connected.
- Prepare test procedures by defining the test conditions and the results to be produced
- Set tolerance limits for each product by manual insertion or using the statistical analysis (mean and standard deviation) of saved results
- Prepare multi-instrument test reports



## Gibitre Standard SQL Database

All the Gibitre programs use a database with SQL structure for saving the results.

The database can be installed inside an SQL instance present on the company server or it can be installed on a PC connected to a measuring instrument. The installation of the Microsoft SQL service (Express version) is included in the delivery.



## Industry 4.0 integration

The instrument and the software have been specifically developed to optimize integration with other environments. The database in SQL format and the Gibitre\_Company\_Connect program allows you synchronize your company management software with Gibitre database and to speed up the identification of the tests and to use bar-code readers or similar devices.



## Preparation of Test Reports

Version 10 programs make the following options available for preparing test reports:

- Selection of printing language
- Company logo insertion
- Print a single test / a Group of tests
- Print of Test Curves
- Print Numerical Results
- Print the Limits of Tolerance
- Print Statistical Results
- Print Legend with explanation of results
- Print the Operator Signature
- Print Customized Notes
- Preparation of PDF file

The program integrates a REPORT EDITOR that allows you to completely edit the report and prepare fully customized report formats.

## Safety devices

The instrument is equipped with:

- Class 1 Safety switch, which prevents the closure of the dies if the safety panel is not closed.
- Safety Push-button
- Safety lock of the maintenance access door, which ensures safe usage even in non-standard operation conditions.
- CE Labelling



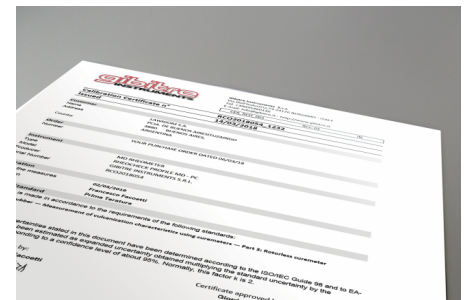
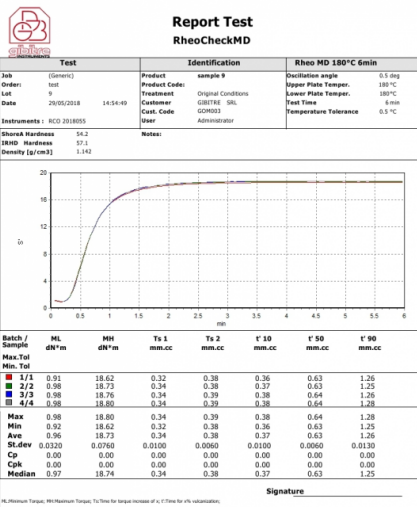
## Calibration of the Instrument

The calibration of the instrument is performed in conformity with the requirements of international standards.

The report includes the following calibration steps: distance between the test dies, temperatures of the upper and lower dies, thermal recovery time at the beginning of the test, oscillation angle, oscillation frequency, closing force of the testing chambers, measurement of torque, measurement of the calibrator spring supplied to the customer, dimensions of testing dies (optional).

The calibration report includes complete traceability to the reference instruments used.

The calibration report includes the final check made with Gibitre standard rubber.



## Development and production

The instrument is totally developed and produced in the plant of Gibitre Instruments in Italy.

All the mechanical parts are produced in the company workshop using modern CNC machines.

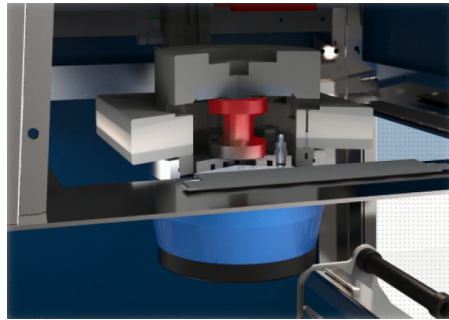
Components and sensors from well-known brands are selected in order to ensure the maximum reliability in the measures

Internal trained personnel takes care of all the production stages: assembly, start-up, calibration, packing, shipment and installation.



## Torque transducer

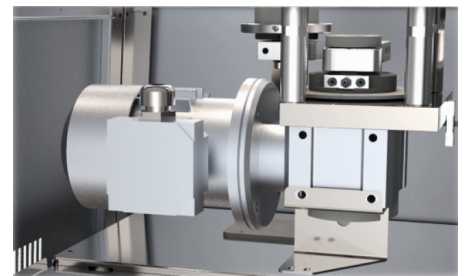
The Interface® torque transducer is positioned in the upper test chamber to minimize the influence of friction and vibrations.



## Die oscillation control

The kinematic for the oscillatory movement of the lower test chamber has been developed to ensure perfect operation of the instrument under heavy operating conditions and for extremely long periods: Siemens® motor, SKF® bearings

Calibrated gauges are supplied together with the instrument to easily set the oscillation angle to 0.5° or 1,0°.



### Constant Volume Sample Cutter

Volumetric Cutting Machine for the preparation of samples with constant volume required by the standard.



### Plastic Foils for MD Rheometer Test

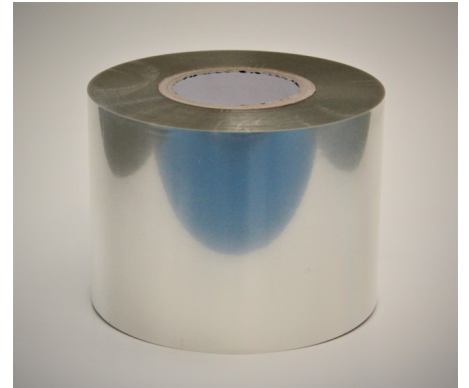
Boxes of polyamide or polyester film sheets to perform tests without automatic loader.



### Film Rolls for automatic loader for MD Rheometer

Polyester or Polyamide film Rolls for automatic loader for MD Rheometer with the following characteristics:  
Film Thickness: 0.023mm  
Film Width: 130 mm  
Internal Diameter of the roll: 76 mm  
Outside Diameter of the roll: 176 mm  
Length of film: 770 m

NOTE: To use the charger, you must use two rolls.  
A pair of rolls allows to carry out (with loader Gibitre) 3200 tests.



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**Instrument Characteristics**


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<b>Torque sensor</b>	Brand: Interface® Capacity: 20 N*m Resolution: 0.01 dN*m Linearity Error (%FS): +-0.25
<b>Oscillation frequency</b>	100 cycles/minute (1,7 ± 0,1 Hz)
<b>Oscillation angle</b>	0.5°, 1° (other angles on request). Easy adjustment of the angle with quick replacement of calibrated gauges
<b>Temperature</b>	Between room temperature and +250 °C - Resolution 0.1 °C
<b>Test Dies:</b>	Biconical dies, closed die system, sealed
<b>Seals for test dies:</b>	Low Friction & easily changeable long-life seals to provide superior lifetimes of up to 10.000 tests
<b>Chamber Closing Force:</b>	11.5 ± 0.5 kN. Chamber closure at reduced speed to improve repeatability and ensure film integrity.
<b>Cooling system</b>	Compressed air cooling circuit
<b>Pressure sensor (optional)</b>	Brand: Interface® Capacity: 7 MPa Resolution: 0.1 kPa Linearity Error (%FS): +-0.25
<b>Software</b>	
<b>Numerical Test Data</b>	Torque Values: MI, ML, M90, MX, MH, PCR S''@ML, S''@MH, TanD@ML, TanD@MH. Scorch Time: tS1, tS2, tSX. Cure Time: t90, tX, tML, tMH, tPCR, tRX, CRI Pressure: PL, PH, tP, MPR, tMPR
<b>Displayed Curves</b>	Elastic (S'), Viscose (S''), Complex (S*), Tan-Delta, storage shear Modulus (G'), loss shear Modulus (G''), Curing speed, Dies Temperatures
<b>Units</b>	Torque: dNm or lbf.in. Time: minutes and seconds, minutes and minutes/100, seconds Temperature: °C, °F

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<b>Results storage</b>	The test result sand the curves are stored in the SQL Gibitre database which is installed in combination with the software
<b>Software usage Languages</b>	Italian, English, French, Spanish, German, Portuguese, Russian, Chinese, Japanese, Turkish, Polish, Czech
<b>Control Panel</b>	
<b>Characteristics</b>	Dimensions 10.2"
<b>Data displayed</b>	Active connection to the software, motor on-off, temperatures of the dies, heating status, sample on sample-holder (with sample loader), test running
<b>Type of device</b>	Capacitive display (permits the use with gloves)
<b>Light Panel</b>	
<b>Permits to check from a distance the following statuses</b>	Instrument ready, instrument under test, instrument setting test temperature, no specimen in the queue (with autoloader)
<b>Safety Devices</b>	
<b>Safety Devices</b>	Class 1 Safety switch for main piston (Idem) Safety Pushbutton Safety lock of the maintenance access door CE labelling
<b>Labelling</b>	CE Labelling
<b>Calibration</b>	
<b>Calibration Report</b>	Calibration report with traceability to primary standards in conformity with the Calibration requirements specified in ISO 6502-3 standard
<b>Calibrated parameters</b>	The certificate includes the calibration of: <ul style="list-style-type: none"> <li>- Torque reading</li> <li>- Temperature of the dies</li> <li>- Speed of temperature recovery at test start.</li> <li>- Oscillation amplitude and frequency</li> <li>- Closure force of the dies</li> <li>- Final verification with standard compound</li> </ul>
<b>Torque Spring for calibration</b>	Torque calibration spring supplied with the instrument
<b>Construction Characteristics</b>	
<b>Electronic Card</b>	Electronic card with STN 32F 429 micro-processor
<b>Power supply</b>	220 VAC $\pm$ 10%, 50-60 Hz $\pm$ 3, 4 A, single phase 110 VAC $\pm$ 10%, 60 Hz $\pm$ 3 on request
<b>Power</b>	700 Watt
<b>Compressed air</b>	6 bar. Compressed air regulation unit integrated into the instrument
<b>Compressed air consumption</b>	Approx.65 NL/cycle
<b>Dimensions and weight</b>	

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Without sample loader (W x D x H): 671 x 684 x 1419 mm

With sample loader (W x D x H): 1229 x 684 x 1419 mm

Weight: 180 Kg

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#### **Personal Computer (optional)**

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**Minimum configuration** Intel Core i3 2 GB RAM

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**Compatible Operating Systems** Windows 10

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**Connection to the instrument** USB port

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#### **Options**

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**Automatic sample loader** Automatic test of 5 samples

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**Volumetric Die Cutter** For the preparation of samples with constant volume

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#### **Polyester & Polyamide Films**

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**Box of Polyamide Foils** Thickness: 0.025 mm  
Dimension: 100 x 100 mm  
Box Content: 500 foils

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**Box of Polyester Foils** Thickness: 0.025 mm  
Dimension: 100 x 100 mm  
Box Content: 500 foils

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**Polyamide film Roll** Film Thickness: 0.023 mm  
Film Width: 130 mm  
Internal Diameter of the roll: 76 mm  
Outside Diameter of the roll: 176 mm  
Length of film: 770 m

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**Polyester film Roll** Film Thickness: 0.023 mm  
Film Width: 130 mm  
Internal Diameter of the roll: 76 mm  
Outside Diameter of the roll: 176 mm  
Length of film: 770 m

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