



EKTRON TEK CO., LTD.

www.ektrontek.com

Mooney Viscometer
EKT-2003M





Introduction

This Mooney Viscometer, which is designed in accordance with ASTM D1646 and JIS K6300 standards, is used to determine the Mooney Viscosity, Stress relaxation and Pre-vulcanization properties of raw and compounded rubber.

Advanced technologies in measurement and control fields enhance the high performance of this test instrument, and friendly Windows system software provides versatile information of rubber characteristics.

Test capabilities

- **Mooney viscosity test**

A determination of the viscosity of raw rubber or compounded rubber.

- **Stress relaxation test**

A determination of the response of a raw or compounded rubber to a sudden deformation. It gives the information of elastic and viscous components of a rubber by determining the rate of stress relaxation.

- **Pre-vulcanization test**

A measure of the time to the incipient vulcanization and cure rate during the early stage of vulcanization.

Test results

Through precise sensor and powerful capability of data and calculation, user can get the following data after the test.

• Mooney viscosity test

EKT-2001M Mooney Viscosity Test Report					
Date : 2008-04-25		Compound no. : SBR1500		Production lot no. : 01	
Temperature : 100°C			Test type : ML 1+ 4		
MV	Batch	MS	ML	ML 1 + 4	QC.
01	0001	65.3	46.5	46.5	O

• Pre-vulcanization test

EKT-2001M Pre-Vulcanization Test Report								
Date : 2008-04-25			Compound no. : SBR23-105			Production lot no. : 02		
Temperature : 150°C				Test type : Scorch L				
MV	Batch	MS	ML	TS5	TS35	MF	CI	QC.
01	0002	45.1	26.5	5-24	9-18	61.5	3.9	O

• Stress relaxation test

EKT-2001M Stress Relaxation Test Report							
Date : 2008-04-25		Compound no. : SBR15-23A			Production lot no. : 03		
Temperature : 100°C				Test type : ML 1+ 4			
MV	Batch	MS	ML	t80	X30	ML1+4	QC.
01	0003	65.3	46.5	21.0	75.1	46.5	O

• **a = - 0.48447 k = 57.69101 r = 0.98696 A = 746.14**

Temperature control capability

• Reducing preheat time

Directly dies heated, precise platinum resistance temperature sensors, and combining the professional temperature control software will shorten the time of preheat as well as the waiting time of changing the test temperature.

• Quick die temperature recovery

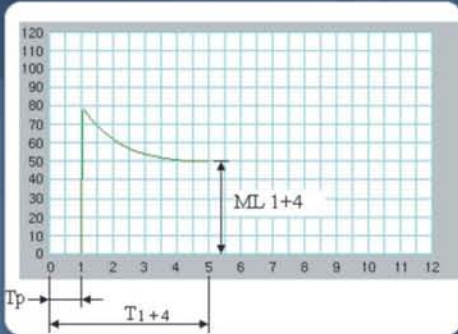
High efficiency heat conduction structures and computer-aided control components significantly shorten the time of die temperature recovery and ensure the stability of die temperature for each test.



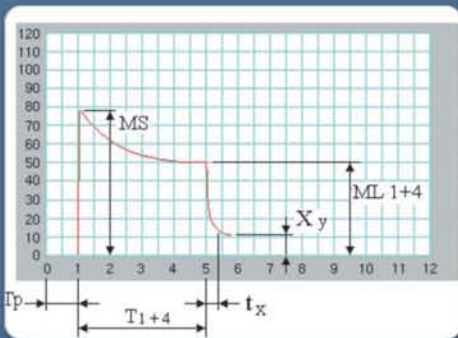
Curves and Data



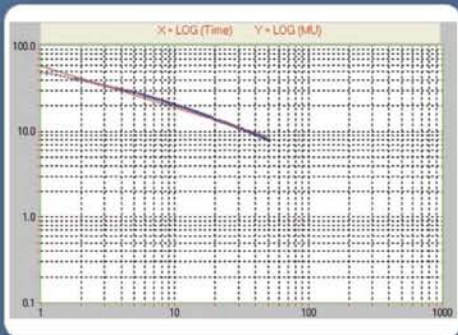
• Colors



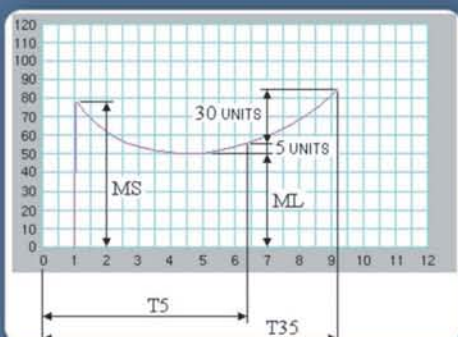
• Mooney viscosity test



• Stress relaxation test



• Stress relaxation curves



• Pre-vulcanization test

• Colors

Color of curves displayed on the screen can be selected.

• Data view

Move the cursor of mouse to the testing curve, the related time and data value of that point will be automatically shown on the monitor.

• Zooming the curve

The curves can be zoomed at any scale by the user during or after test.

• Mooney viscosity test

T_p : Preheat Time

T_{1+4} : Preheat 1 min. + test 4 min.

ML 1+4: MV value at time T

• Stress relaxation test

T_p : Preheat time

T_{1+4} : Preheat 1 min. + test 4 min.

MS: Initial MV value

ML 1+4: MV value at time T

X_y : Decay percent

t_x : Time at decay percent

• Stress relaxation curves

$X = \text{LOG}(\text{Time})$ $Y = \text{LOG}(\text{MU})$

$\text{Log } M = a(\text{Log } t) + \text{Log } k$

r : The correlation coefficient

a : An exponent that determines the rate of stress relaxation

k : a constant equal to the torque in Mooney units 1s after the disk is stopped.

A : Area under the relaxation curve (t_0) to the end of (t_f)

• Pre-vulcanization test

MS: Initial MV value

ML: Min. MV value

T_5 : Time at (ML + 5 unit MV)

T_{35} : Time at (ML + 35 unit MV)



Simplified operation

- **Simplified operation control panel**

User can easily operate the machine by easy controlled panel.

- **Computerized operation system**

Computerized operation system provides the benefits of storing large amounts of test parameters and specifications to simplify the setting operations.

- **Pneumatic rotor push out**

Pneumatic rotor push out function simplifies the operation of taking the rotor out from the lower die and minimize the time of specimen replacement.

- **Easy-cleaned die**

The radial die is designed in accordance with international standards and the new designed structure is easy to take out the sample and extend the life of dies.

Structure protection

In order to protect the mechanisms and sensing device, test will be terminated automatically when the viscosity is over 200 Mooney value.

Data calculation and storage

- **Auto-calculation**

During the test or the end of test, the computer can automatically calculate and save the test results so that users can select what they need from the database and put them into the editable report.

- **Data storage**

Large capacity of memory device is available for saving all the testing statistics and for being the basis of data resources analysis and review.

Calibration

- **Auxiliary software**

By using calibration software, the Mooney value calibration can be easily accomplished after the standard weights are installed onto the machine.

- **Standard weights**

A master apparatus maintained by the EKTRON TEK verified the standard weights used to calibrate Mooney value.

- **Rotor**

Large and small size rotors enable the user to test both hard and soft Compounds.



• **Easy-cleaned die**

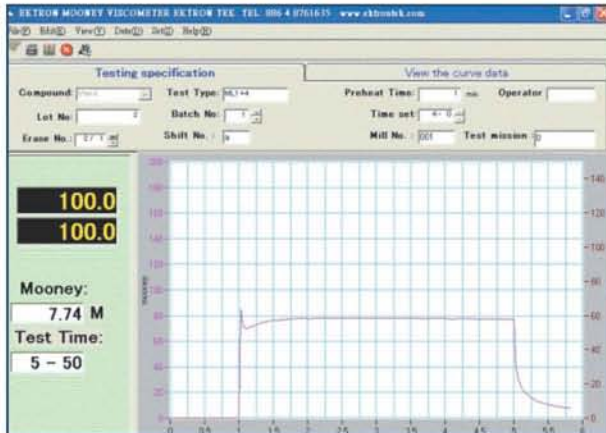


• **Rotor**



• **Standard weights**

Additional functions



* Microsoft Windows is the registered trademark of Microsoft Corporation.

• Report compiler

Report compiler software offers the user an open and free space to design the ideal format of test report.

• Quality control classes

A quality control function enables the user to setup A/B classes of control gates to check the test results of Mooney value and scorch time.

• Control points

More than 18 points of time relating to Mooney value settings enable the user to control the quality of Mooney value at any time of test curve.

• Curves selection

Saved curves and data are available for retrieving onto the monitor or printing out.

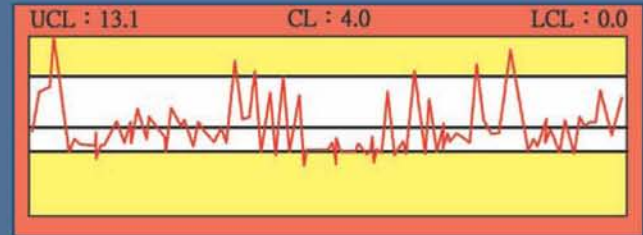
SPC software

Statistical process control software (SPC) automatically store and analyze the test results of Mooney values and scorch times such as ML, MF, T5, T35...etc.

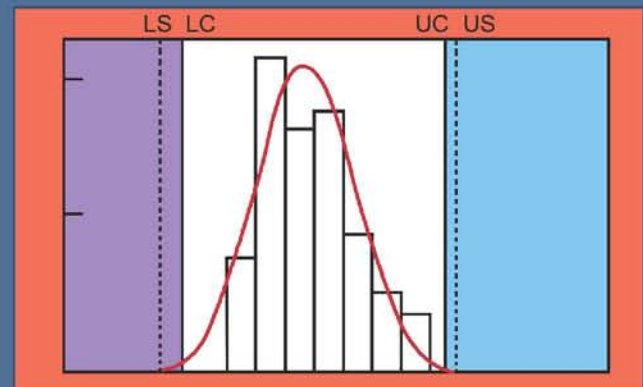


▲ X-Rm

SPC software is available for drawing the X-Rm, \bar{X} -R, Histogram and Normal Distribution charts.



This SPC software is able to calculate and analyze some process capability data such as the Standard deviation, Cp. Value, Cpk value, Skewness, Quality limits, Average...etc.

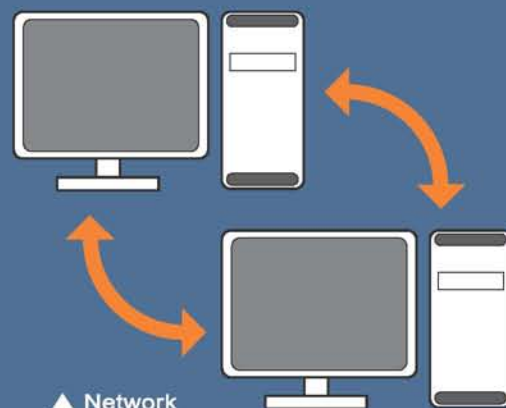


▲ Normal Distribution

Data compatibility

The test results produced by this instrument can be applied to another software such as Excel.

This SPC software enable the user inserts any data that was not produced by this instrument into the data files. And the inserted data will be resorted in accordance with the compound categories.



By means of the network interface cards, multiple sets of instruments can be connected together for data communication. A host computer can accomplish this.

Specification

Standards	According to ASTM D1646, ISO289, JIS K6300, GB/ T 1232, DIN 53525, BS1673
Rotating frequency	2.0 r/min. (0.21 rad / s)
Test temperature	Usable range from ambient +10°C ~ 200°C PID control High temperature are available on customer's order
Temperature accuracy	Within ±0.3°C
Unit	Mooney value M (= 0.735 lbin) Temperature °C, °F
Language	Traditional Chinese, Simplified Chinese, English
Rotor	Large / Small size
Air pressure	4.5 ~ 5.0kg / cm ²
Sample volume	≈ 25cm ³
Basic components	Main machinery (Host computer) for testing and sub machinery for controlling (including computer, colorful monitor, printer and temperature control module)
Accessory	Standard weights
Electricity	Single phase 220±10% VAC, 50/60±3Hz, 10 Amp
Dimensions	Main machinery 1300(H) x 560(W) x 620(L)mm Sub machinery 850(H) x 600(W) x 680(L)mm



EKTRON TEK CO., LTD.

LEADING MANUFACTURER IN TESTING INDUSTRY

Certification



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Main Product:

• RHEOMETER

- Dynamic Processing Rheometer
- Moving Die (Foam Pressure) Rheometer
- Moving Die Rheometer
- Oscillating Disc Rheometer

• Tensile Tester

• Mooney Viscometer

• Plunger Tester

• Mixing Grader

• Vibration Simulator

• Flexometer

• Automatic Ozone Test Chamber

• Fatigue Failure Tester

• Demattia Flexing Fatigue Tester

• Low Temperature Retraction Tester

• Gas Permeability Tester

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