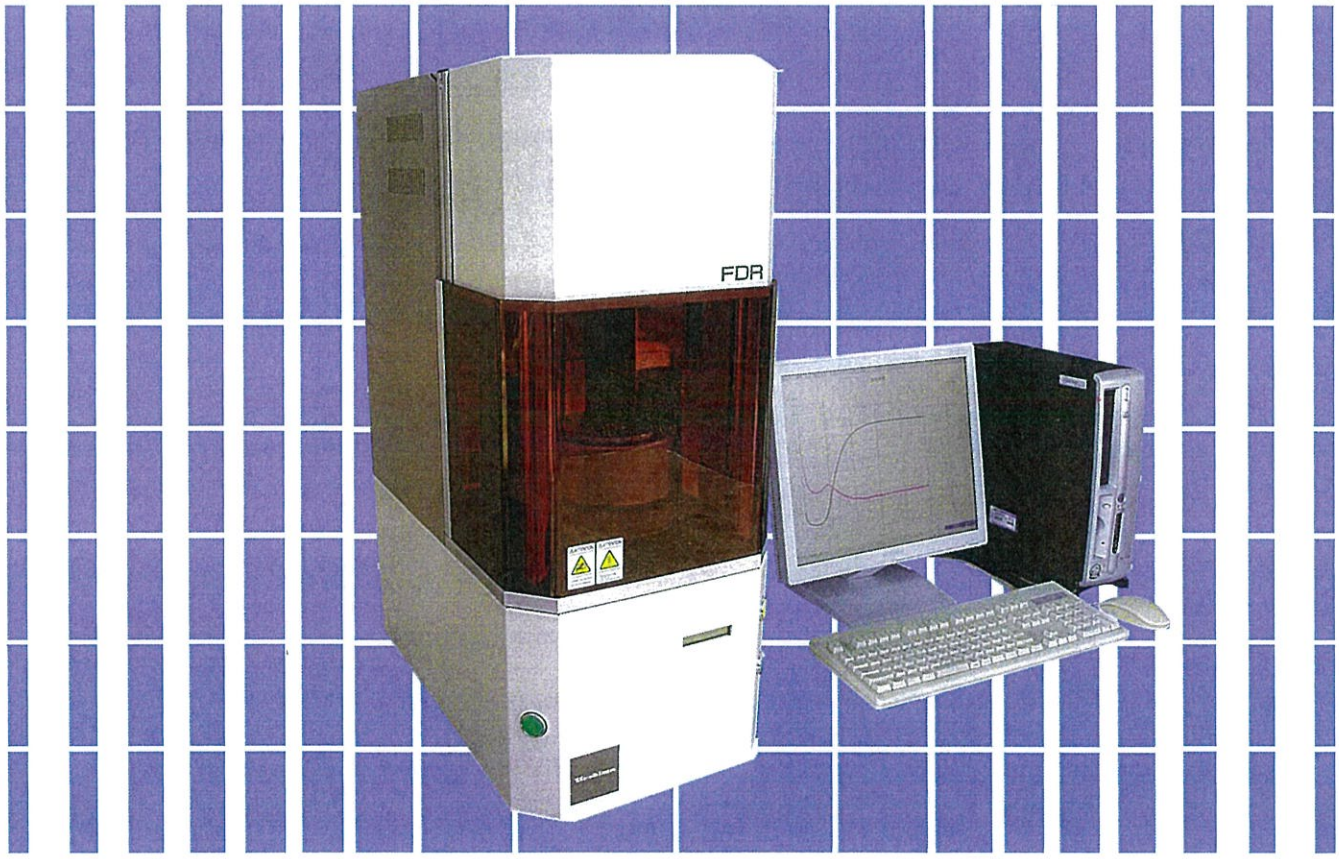
Ueshima

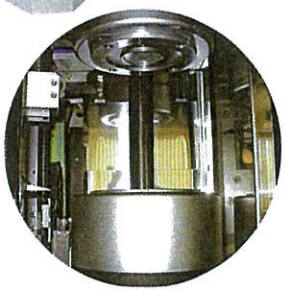
限りある資源と美しい自然を大切に

FDR® SERIES VR-3110
FLAT DIE RHEOMETER



UESHIMA SEISAKUSHO CO., LTD.

FDR
Vulcanization
Tester



Applied Standards

JIS K6300-2, ISO6502

(Oscillating Sealed Flat Die Cavity Rotorless Curemeter)

FDR (Flat Die Rheometer), manufactured by Ueshima Seisakusho Co., Ltd., is a high precision rubber vulcanization tester in conformity to Japanese Industrial Standard (JIS) and International Organization for Standardization (ISO). It gives small sinusoidal vibration that does not destroy the compounded rubber and expresses the torque that changes with the progress of vulcanization as a function of time (vulcanization curve), and shows the physical properties like minimum torque, the maximum torque, the scorch time, the vulcanization time and viscoelastic properties.

Application

●Measurement of vulcanization characteristics of compounded rubber along with the vulcanization process.

●Measurement of viscosity of raw and compounded rubber.

Outstanding Features

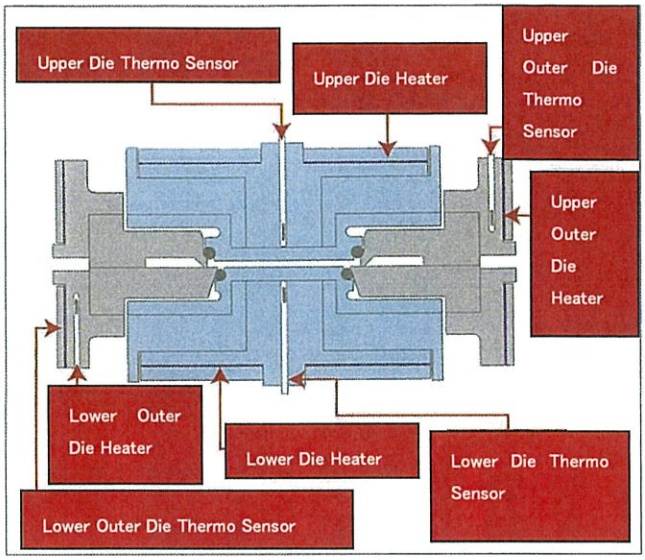
●Excellent Temperature Control by 4HD (4 Heater Drive)

(Film Heaters are adopted and each of them is controlled by PID.)

・Shortened warm-up time.

・Shortened temperature recovery time after placing a sample.

・Excellent repeatability of test results.



< Construction of Torsional Vibration-type Flat Plate Die >

●Compact and Lightweight (Minimized installation space)

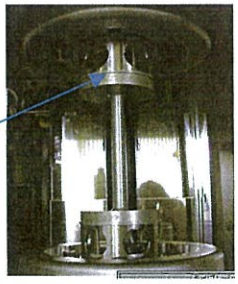
●Conical drive, which adopts conical rotary movement, realizes an accurate sinusoidal oscillation.

●Simple Calibration System

・Automatic Calibration of Load Cell by Electric Calibration System

・Automatic Calibration of Phase and Torque by a Dynamic Calibrator

Dynamic Calibration



●Easy Operation and Data Management by PC

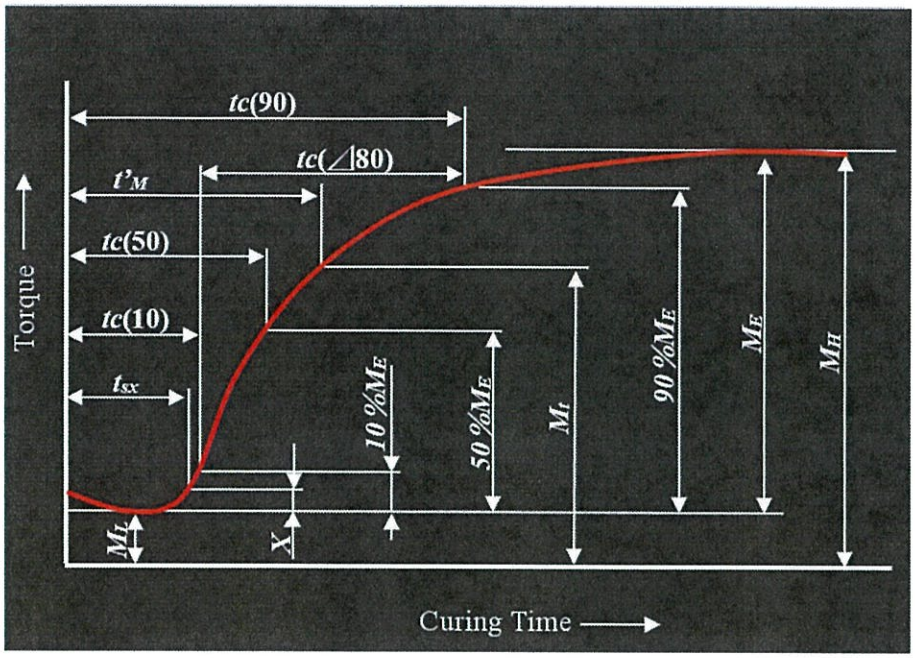
・The measurement results can be easily exported to spreadsheet software like EXCEL, enabling easy preparation of reports, histograms and control charts.

●Unitization of Each Unit for Easy Maintenance

・Heater, load cell and other input / output related amplifiers are unitized into a PCB in the machine.

・Supply of units such as heater and temperature sensor

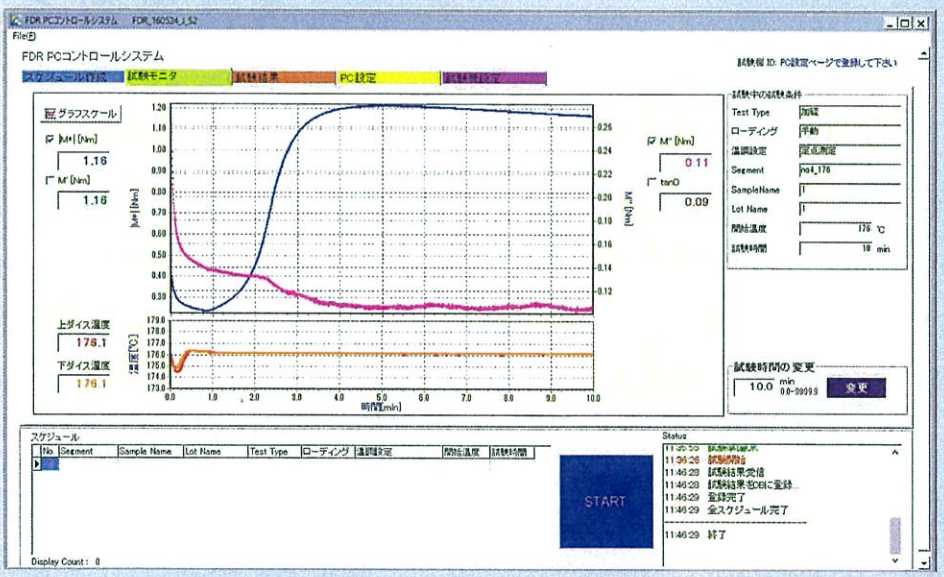
Measurement Principle



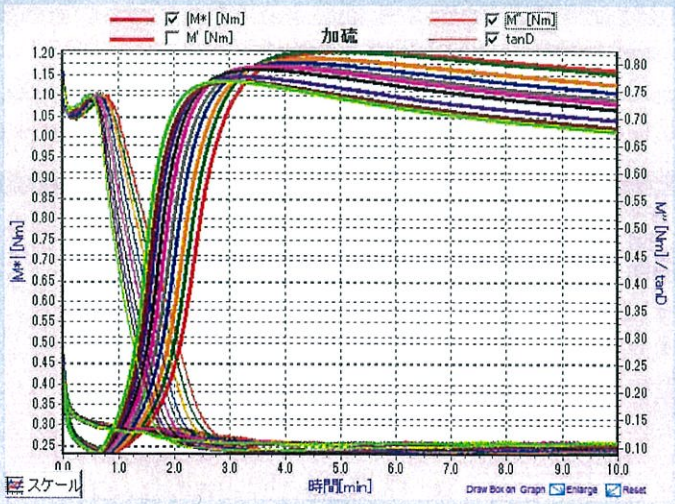
By placing compounded rubber between the upper and lower dies at a specified temperature, it measures torque which varies with rubber vulcanization while being subjected to sinusoidal torsional vibration. The vulcanization characteristics can be obtained while tracing changes in viscoelasticity during vulcanization process.

FDR Standard Type (VR-3110)

◆Vulcanization Test

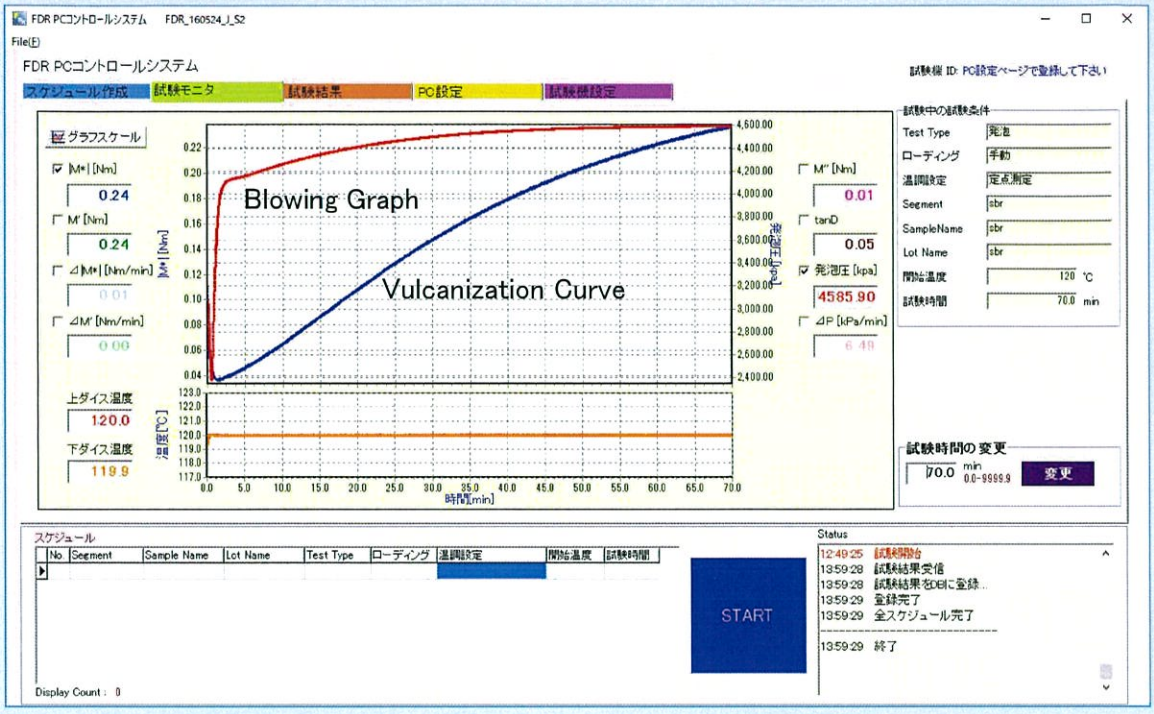


◆The vulcanization curve can be measured in every 1°C.



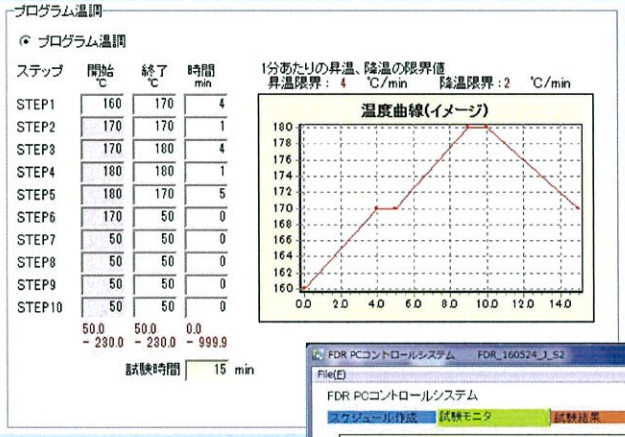
FDR Sponging Pressure Measurement (VR-3111)

◆Blowing Characteristics Test



FDR Programmable Temperature Control (Option)

◆Vulcanization Test under Programmable Temperature Control



＜Settings of Programmable Temperature Control Test＞

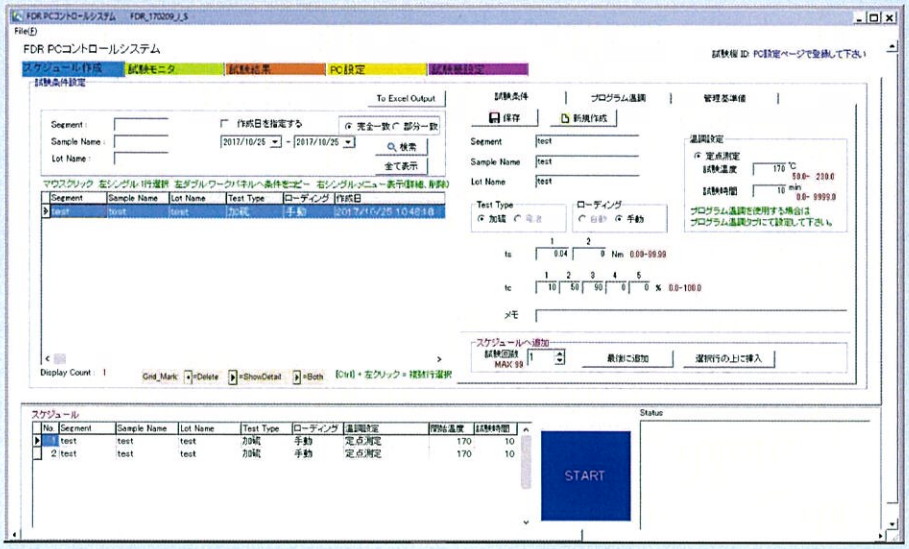
Temperature Setting：Settable up to 10 steps

Temperature Rising Condition：Less than 4° C/minute

Temperature Lowering Condition：Less than 2° C /minute

Temperature Profile

Test Condition Input Screen of PC



Vulcanization Test

＜Input Items＞

① Testing Temperature

② Test Time※

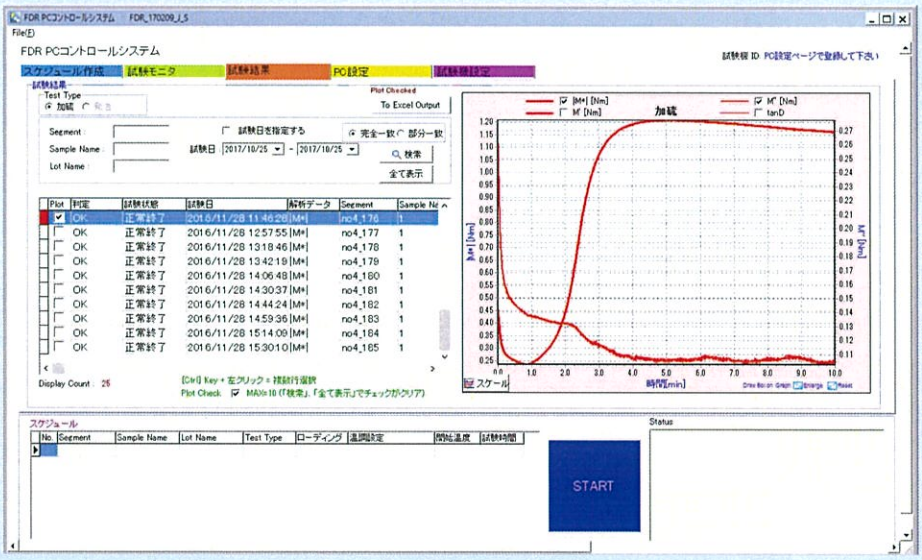
③ Ts Scorch Time

④ Tc Vulcanization Time

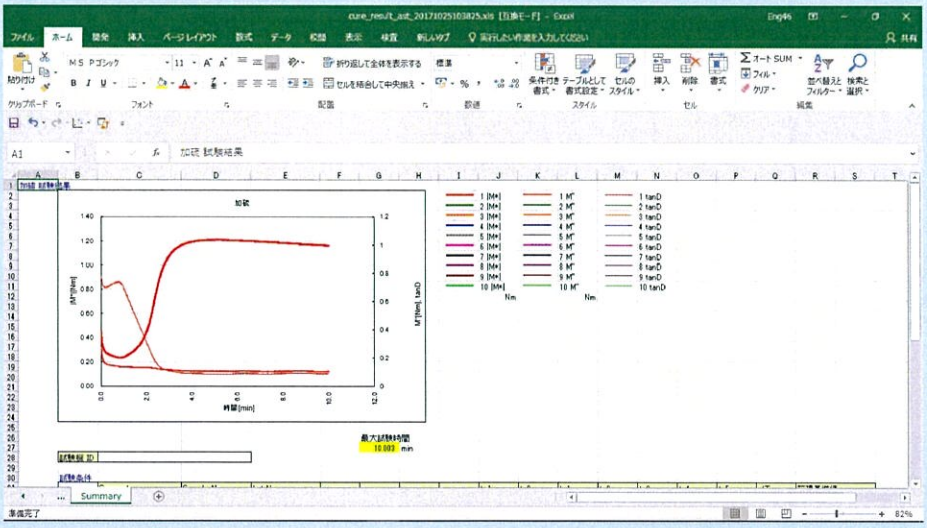
※Changeable during a test

Data Base

●Test Result Confirmation Screen



●Test Results Exported to EXCEL



Specifications

	Standard Type	Sponging Pressure Measurement Type
Name	FDR(Flat Die Rheometer)	
Model	VR-3110	VR-3111
Shape of Die	No friction flat sealed cavity(JIS & ISO compliant)	
Pressurizing Method	Pneumatic Cylinder (Oil-less type) Cylinder Inner Diameter: 160mm	
Oscillation Drive Method	Sinusoidal Vibration Mechanism by Conical Rotational Motion "Cone Drive"	
Oscillation Drive Motor	Synchronous Motor 25W AC100V	
Oscillation Transmitting Method	Elastic Connection by Leaf Spring	
Frequency	1.67Hz (100cpm)	
Oscillation Angle	±1°	
Oscillation Angle Accuracy	2±0.03° (Without Load)	
Torque Detecting Method	Strain Gauge Type Load Cell	
Torque Transmission Method	Elastic Connection by Leaf Spring	
Sponging Pressure Measurement	–	0 to 6000kPa
Testing Temperature Range	50 to 230°C	
Temperature Control Accuracy	Die Temperature: ±0.3°C at 190°C Internal and External Die Temperature Difference: ±1.0°C at 190°C	
Heat Control Method	Independent PID Control on four pieces of Film Heaters (Upper / Lower Die, Upper Outer / Lower Outer Die)	
Temperature Sensor	Platinum Resistance Sensor (Pt100) 4pcs	
Maximum Testing Time	9999minutes	
Shield Cover	Colored Acrylic on Front and Sides (Preventing external air and for Safety)	
Safety Equipment	(1) Two-hand Press Start Switch (Cylinder lifts only when both buttons are pressed simultaneously.) (2) Overload Protection (more than 22N·m) (3) Overheat Protection (Heater will be turned off at 240°C or higher.)	
Communications	RS232C	
Utilities	(1) Power Source: AC100V, Single Phase, Power Consumption less than 700VA (2) Air Source: Dry Air 0.343 to 0.7MPa	
Dimensions and Weight	Approx.333(W)×520(D)×780(H)mm, Approx.110kg	
Standard Items	(1) Equipment main unit: 1 set (2) Accessories 1set (Software, Calibration Kit, Special Tool,)	

●The PC is basically to be provided by the customer. We recommend the following specifications.

OS : Windows 7 or later CPU : Intel Core i3 or higher MEMORY : 4 GB or more STORAGE : 500 GB or more
SLOTS : PCIe SLOT 1pc Required (VR-3111 requires 1pc PCI SLOT additionally.)
DISPLAY : 1280 X 1024 SOFTWARE : Microsoft Excel (Microsoft Office 2016 or later)

Option

●Programmable Temperature Control

[Application] It simulates vulcanization of large sized rubber products, continuous vulcanization, mold vulcanization, etc. to examine vulcanization characteristics with rising temperature at a preset temperature rise.

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