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No. 586 Film Stretching Tester
Model EX10B1

■APPLICATION

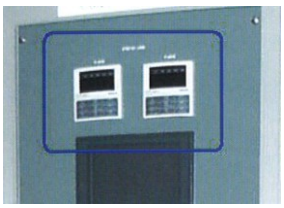
The needs to add extra values to plastic films are more and more increasing in recent years requesting of the testers for further improvements in precision and function. This machine provides highly improved stretching precision and various types of stretching modes employing a servo driving system. It allows you to test biaxially-stretched films under various conditions and surely obtain most suitable conditions for the sample.

■FEATURES

- The center stretching type is employed as the stretching method. In collaboration with the servo motor used as the driving system, it realizes uniform film through precision stretching.
- Stretching under various conditions available by setting up the stretching program
- Quick and safe mounting of the sample with gas-pressure grips
- A variety of options including stretching ratio, load sensing, secondary heating unit, and data processing allows you to select a machine specification most suitable for your needs.

Temperature Control Panel

Load Detecting Unit (Option)



Load display

Operation Panel

Temperature Control Panel

The temperature controller is built in the temperature control panel. Temperature is controlled individually in total of twelve blocks, i.e. six blocks on both upper and lower sides respectively (plate heaters and test piece preheaters). Among them, the plate heaters, test piece preheaters and preheaters are equipped with SCR circuits inside. Especially the plate heaters are equipped with ten SCR circuits and five voltage control circuits on each sides respectively to surely uniform the temperatures. As a result, the temperatures at twelve points can be fully uniformed. The temperatures are indicated on the display of the program controller, and six points of them are recorded by the 6-point recorder.

Load Detecting Unit (Option)

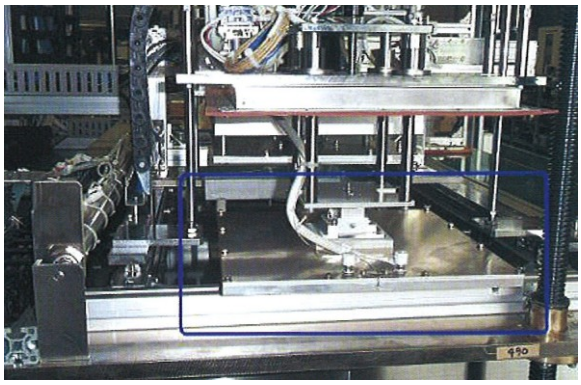
Optional load recorder can be installed respectively in lateral and longitudinal directions as required.
For load sensing, a strain gauge of special heat-resistant structure is attached to the center grip covering a force of 200N (20kgf) at the maximum.

Operation Panel

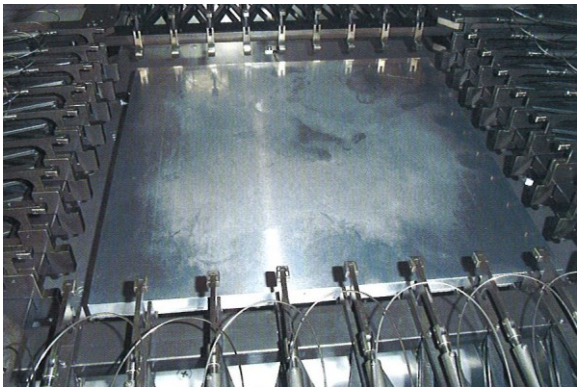
Frequently-used button are concentrated on the operation panel to facilitate the operation.
The timer allows you to set the preheat time of the test piece in advance. Interlocking with the stretching start button automatically starts stretching. Also in the sequential biaxial stretching mode, Y-axis stretching is automatically performed after a lapse of the time preset on the timer after X-axis stretching is completed.

■OPTIONS

1. Secondary Heating Unit (Model 2NDH-2)



Secondary heating plate (Upper side) on stand-by

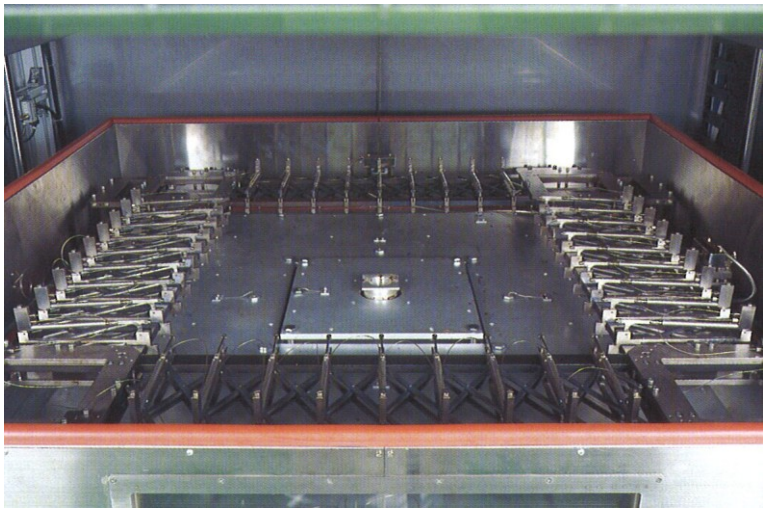


Secondary heating plate (Lower side)

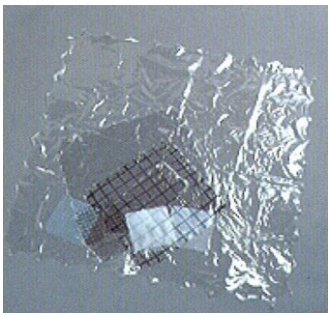
2. Personal Computer type Load Detecting Unit (Model LDSP-2)

■STRECHING MECHANISM

Precision-machined chuck and link realize smooth stretching even from low ration with very high precision.



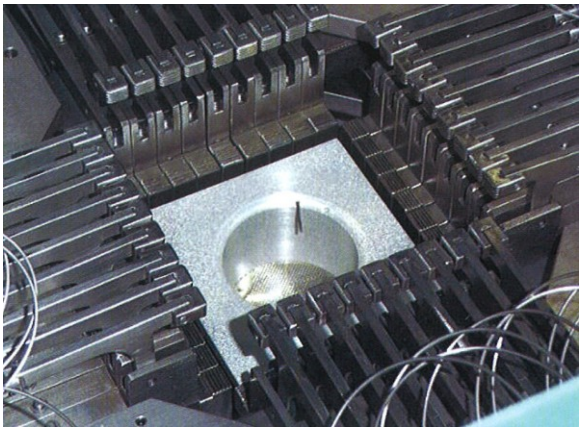
Inside of the model EX10B1 chamber



Stretched film

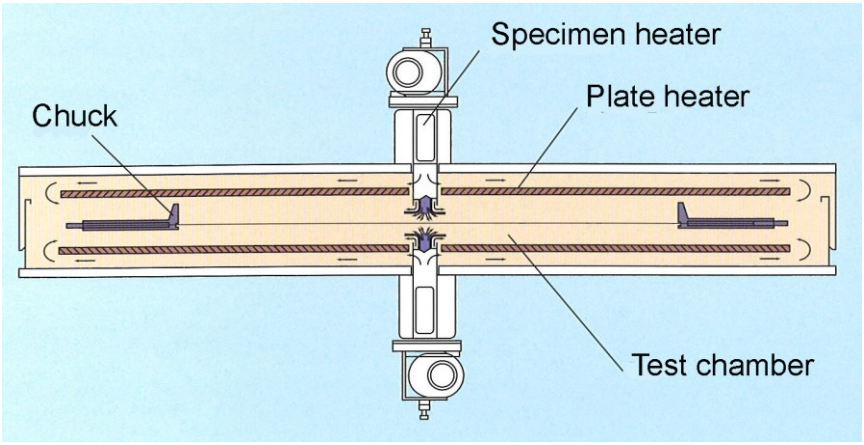
■GRIPS

The grips of model EX10B1 employ a gas cylinder to open upward. Consequently, they easily chuck even thick samples or samples prone to curl and save the sample used in a test.
Samples can be clamped by N2 gas pressure with one push of a button quickly and simultaneously. The retaining pressures do not vary and they can by adjusted within 3MPa to minimize the factor of slippage or break at the chuck.
Total of 36 grips (i.e. 9 grips on each side respectively) are provided to minimize the troubles such as neck-in, break at the chuck, etc. One grip can carry a load of 200N at the maximum, and a sample over 1.8mm thick can be stretched.



Shapes of the grips

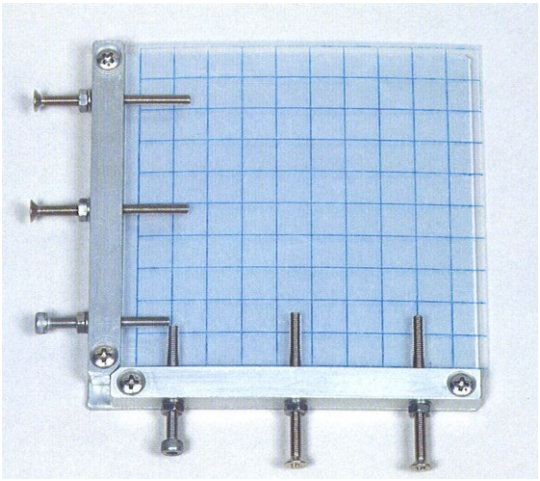
■HEATING MECHANISM

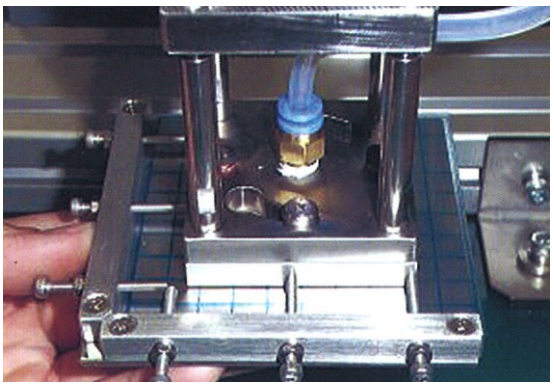


Model EX10B1 is composed of the plate heaters for heating the inside of the chamber and the specimen heaters for heating the sample.
The combination of these heaters makes the temperature inside the chamber uniform.

■TEST PIECE SETTING MECHANISM

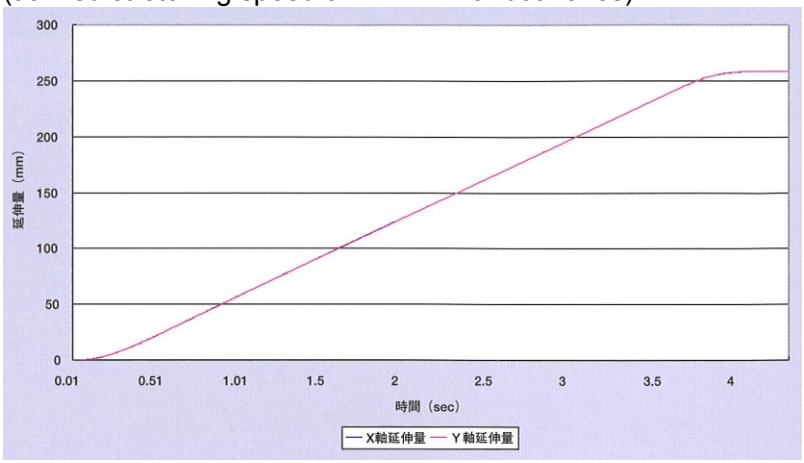
To set a test piece, mount it to the suction plate using a mounting jig first.
The test piece is inserted into the grip position inside the chamber by the automatic arm and safely chucked.



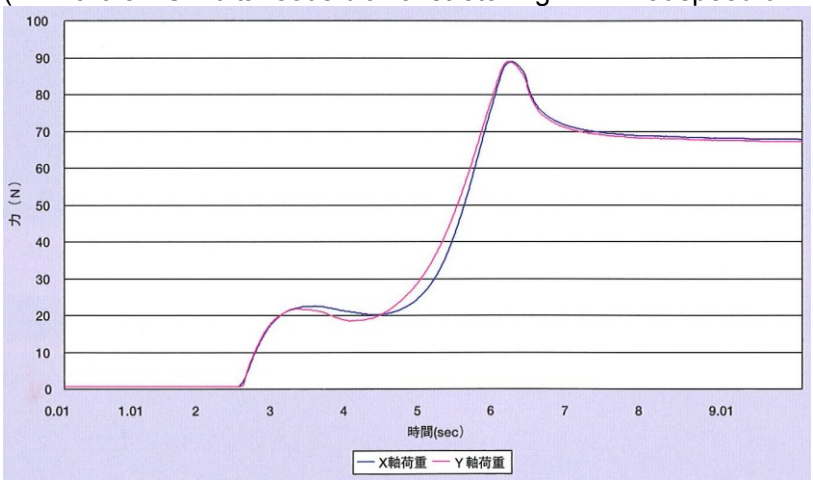


EXAMPLE OF OUTPUT DATA
(Using Optional Personal Computer type Load Detecting Unit)

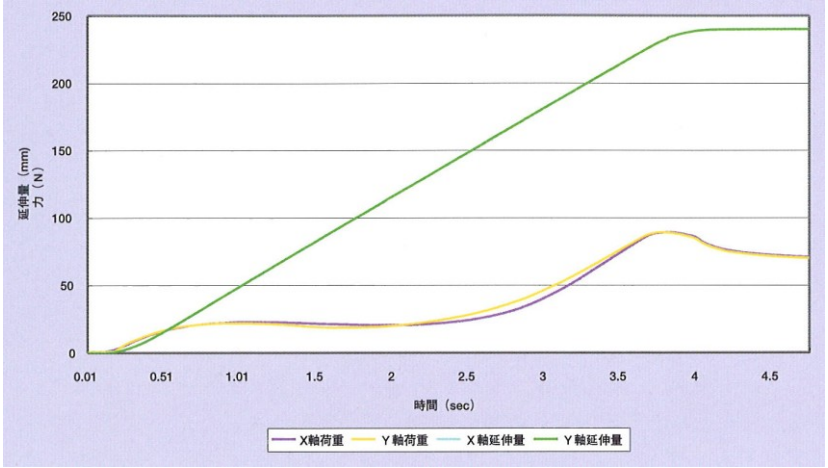
Displacement – Elapsed Time
(at fixed stretching speed of 4m/min. for both axes)



Force – Elapsed Time
(PET t=0.5　Simultaneous biaxial stretching　4 x 4 at speed of 4m/min.)



Displacement and Force – Elapsed time
(PET t=0.5　Simultaneous biaxial stretching　4 x 4 at speed of 4m/min.)



■SPECIFICATIONS

Model	EX10B1
Dimensions of sample	90 x 90mm (72 x 72mm, between grips)
Number of grips	36
Grip driving method	N2 gas
Shapes of piston and grip	Knurled
Max. grip pressure	3MPa
Max. stretching ratio	10 x 10
Stretching ratio setting	By touch-screen
Stretching speed	0.003 to 26m/min.
Precision of stretching speed (at constant speed)	Set speed ±2% or less
Stretching mechanism	Pantograph mechanism (Center stretching)
Stretching mode	■ Simultaneous biaxial stretching ■ Sequential biaxial stretching ■ Constant-width uniaxial stretching ■ Manual stretching ■ Manual uniaxial stretching ■ Stress relaxation after stretching ■ Programmed multistage stretching
Driving system	AC servo motor
Temperature range	70 to 230°C
Temperature distribution	±1.3°C or less at 130°C or below ±1% or less at 130°C or above
Temperature indication	12-point temperature controller
Temperature log	6-point recorder
Temperature control	12-segment SCR PID control
Load cell for load detecting unit (Option)	Max. 200N
Sample mounting method	Mounted to the suction plate through a vacuum ejector
Safety devices	■ Thermostatic chamber anti-drop mechanism ■ Overheat prevention mechanism ■ Motor overload prevention mechanism ■ Excessive stretching prevention mechanism ■ Driving emergency stop mechanism ■ Earth leakage prevention mechanism ■ Burn prevention cover
Power requirement	Three-phase, AC200V, 50/60Hz, 35kVA
Other utilities requirements	Compressed air source: 0.7MPa N2 Gas: 5 to 15MPa (Gas cylinder should be prepared by user)
Dimensions (Approx.)	Main unit: W2000 x D2200 x H2200mm Operation panel: W570 x D630 x H1800mm Temperature control panel: W570 x D630 x H1800mm Personal computer type load detecting unit (Option): W600 x D650 x H1300mm
Weight (Approx.)	Main unit: 1300kg Operation panel: 200kg Temperature control panel: 200kg Personal computer type load detecting unit (Option): 40kg

Specifications are subject to change without notice.

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