

Testing machines for Paper & Pulp



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Founded in 1934 in Tokyo, Japan, TOYOSEIKI has been contributing to the field of material R&D and quality assurance through supplying various kinds of reliable testing machines to the industries. Today, TOYOSEIKI is recognized as one of the leading supplier especially for polymer testing equipment.

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1. Tensile / Peeling

■No.210 Strograph E3

Single column, tabletop universal testing machines, up to 1kN



E3-S

E3-L

The TOYOSEIKI **Strograph E3** series are the most cost effective single column tabletop universal tensile machines designed for testing tensile, bend/flexure, compression, peel, friction etc. of various materials ranging up to 1kN.

Model	E3-S	E3-L
Load cell capacity	Max. 1kN	
Force accuracy	$\pm 1.0\%$ of reading (Down to 1/500 of load cell capacity) Conforms to ISO 7500-1 (JIS B 7721) Class 1	
Crosshead speed range	0.05 to 1500mm/min., 22 steps	
Crosshead speed accuracy	$\pm 0.5\%$ (0.5 to 1000mm/min)	
Crosshead travel distance (Excluding chucks)	490mm	990mm
Effective stroke	330mm (Using J-3 chuck)	830mm (Using J-3 chuck)
Power requirement	Single-phase, AC100 to 115V or AC200 to 230V, 50/60Hz, 0.3kVA	
Dimensions	W435 x D460 x H900mm	W435 x D460 x H1400mm
Weight	Approx. 47kg	Approx. 62kg

■No.260 Strograph VGS / VG series

Dual column, universal testing machine, up to 5kN (VGS), 20kN (VG)



VGS

VG with optional stand

The TOYOSEIKI **Strograph VGS/VG** series dual column, universal testing machines are designed for testing tensile, bend/flexure, compression, peel, friction etc. of various materials, ranging up to 5kN (VGS), 20kN (VG).

Model	VGS (05F, 1F, 5F)	VG (1F, 5F, 10F, 20F)
Load cell capacity	Max. 5kN	Max. 20kN
Force accuracy	$\pm 1.0\%$ of reading (Down to 1/500 of load cell capacity) Conforms to ISO 7500-1 (JIS B 7721) Class 1	
Crosshead speed range	0.0005 to 1000mm/min., 23 steps	
Crosshead speed accuracy	$\pm 0.1\%$ (0.5 to 500mm/min)	
Crosshead travel distance (Excluding chucks)	830mm	1100mm
Effective stroke	495mm (Using C-3 chuck) 610mm (Using Box chuck)	595mm (Using C-1 chuck) 670mm (Using C-2 chuck) 750mm (Using C-3 chuck) 785mm (Using C-4 chuck)
Power requirement	Single-phase, AC100V, 50/60Hz, 0.7kVA	Single-phase, AC100V, 50/60Hz, 0.8kVA
Dimensions	W600 x D470 x H1300mm	W720 x D470 x H1600mm
Weight	Approx. 105kg	Approx. 135kg

2. Friction

■No.557 Friction Tester, model AN, AN-S2

Inclined plane method friction (slip angle) tester



AN



AN-S2

The TOYOSEIKI **Friction Tester model AN, AN-S2** evaluates friction coefficient by placing sample (block) on an inclined plane, gradually increasing the angle of inclination and determining the angle at which the block starts moving.

Model	AN	AN-S2
Measurement range of coefficient of static friction (tanθ)	0 to 2.747 (Resolution: 0.001)	0 to 1.732 (Resolution: 0.001)
Max. table angle	70° (Resolution: 0.1°)	60° (Resolution: 0.1°)
Table inclination speed	1.0, 1.5, 2.0, 2.7, 3.0°/s	1.5 ± 0.5°/s
Table dimensions	W320 x D210mm	W150 x D120mm
Sled	W60 x 100mm, 1000g	
Power supply	Single-phase, AC100 to 240V, 50/60Hz, 0.3kVA	Single-phase, AC100V, 50/60Hz, 0.2kVA
Dimensions	W360 x D550 x H250mm	W280 x D468 x H235mm
Net weight	28kg	12kg
Related standards	JIS P 8147 ASTM D4521 TAPPI T542	

■No.557 Friction Tester, model HM-3

Horizontal plane method friction tester



The TOYOSEIKI **Friction Tester, model HM-3** measures friction coefficient (μ S, μ D) of plastic films.

Model	HM-3
Table speed	5 to 1500mm/min.
Table drive motor	Servo motor
Table stroke	1 to 200mm
Table size	W330 x D225mm
Load cell	To be selected upon order ■10N (For 200g sled) ■20N (For 1000g sled)
Sled	To be selected upon order ■63 x 63mm, 200g...For plastic films & sheets (ISO 8295/JIS K 7125) ■60 x 100mm, 1000g...For paper & cardboard (JIS P 8147)
Power requirement	Single-phase, AC100 to 240V, 50/60Hz, 0.2kVA
Dimensions	W540 (Max.630) x D350 x H280mm W650 x D350 x H330mm (Including optional safety cover)
Weight	Approx. 19kg
Related standards	ISO 8295 (JIS K 7125) JIS P 8147

3. Tearing

■No.164 Digital Elmendorf type Tearing Tester

Digital model Elmendorf type Tearing Tester



The TOYOSEIKI **Digital Elmendorf Type Tearing Tester** evaluates resistance of paper etc. based on Elmendorf method. Tearing resistance is determined from the loss of potential energy of a fan shaped pendulum and the results are automatically calculated displayed on the touchscreen.

Model	SA	SA-W	HD-D
Capacity (Scale)*1 ★Using additional weight	16N	16N 32N★	32N 64N★
Number of samples	1 to 16 pieces		
Chucks (Jaws)	Pneumatic		
Energy indication	Digital		
Interface	RS-232C		
Power requirement	Single-phase, AC100V, 50/60Hz, 0.1kVA (Other voltages upon request)		
Compressed air requirement	0.4MPa or more		
Dimensions (Approx.)	W500 x D420 x H700mm		W630 x D250 x H660mm (Main unit) W260 x D350 x H200mm (Measuring unit)
Weight (Approx.)	33kg	36kg	36kg (Main unit), 5kg (Measuring unit)
Related standards (Plastic films)	ISO 6383-2 (JIS K 7128-2)		

■No.163 Elmendorf type Tearing Tester

Analog model Elmendorf type Tearing Tester



Model	S-01	S-16	D-02	D-32	HD
Capacity (Scale)* ¹	0-1000mN	0-16N	0-1000mN	0-16N	0-32N
*Using additional weight			0-2000mN★	0-32N★	0-64N★
Number of sample	16 pieces	1 piece	16 pieces	1 piece	1 piece
Energy indication	Analog scale				
Chucks (Jaws)	Manual clamp				
Dimensions	W500 x D270 x H550mm				W630 x D250 x H660mm
Weight	14kg		17kg		36kg
Related standards	ISO 1974 (JIS P 8116)...Paper				
	ISO 6383-2 (JIS K 7128-2), ASTM D 1922...Plastic film				
	JIS L 1096...Textile				

4. Bursting

■No.167 Mullen Burst Tester, model M2-LD / M2-HD

Digital model Mullen Burst Tester



M2-LD / M2-HD

The TOYOSEIKI **Mullen type Burst Tester** evaluates bursting strength of paper, etc.

Model	M2-LD (Low pressure type)	M2-HD (High pressure type)
Pressure gauge	Max. 2000kPa	Max. 7000kPa
Glycerin feed rate	95±5ml/min.	170±10ml/min.
Sample clamping system	Automatic pneumatic clamping (300 to 1177kPa)	
Clamp dimensions	Upper ■ Outer dia. Ø70mm ■ Inner dia. Ø30.48mm Lower ■ Outer dia. Ø31.5mm ■ Thickness 3.18mm	Upper ■ Outer dia. Ø100mm, ■ Inner dia. Ø31.5mm Lower ■ Outer dia. Ø31.5mm ■ Thickness 5.6mm
Safeguards	■ Finger protection mechanism ■ Glycerin scattering prevention ■ Overload protection ■ Drive safety limiters	
Interface	RS232C	
Power requirement	Single-phase, AC100V, 50Hz or 60Hz, 0.3kVA	Single-phase, AC100V, 50Hz or 60Hz, 0.5kVA
Compressed air	0.4MPa minimum	
Dimensions	Approx. W350 x D380 x H500mm	
Weight	Approx. 70kg	
Related standards	ISO 2758 (Paper & Cardboard) JIS P 8112 (Paper & Cardboard)	ISO 2759 (Paper & Cardboard) JIS P 8131 (Paper & Cardboard)

■No.167 Mullen Burst Tester, model E-L / E-H

Analog model Mullen Burst Tester



E-L / E-H

Model	E-L (Low pressure type)	E-H (High pressure type)
Pressure gauge	2 types of gauge can be selected from below. ■ 0-500kPa ■ 0-1000kPa ■ 0-2500kPa	2 types of gauge can be selected from below. ■ 0-2500kPa ■ 0-5000kPa ■ 0-7000kPa
Power requirement	Single-phase, AC100V, 50Hz or 60Hz, 0.3kVA	Single-phase, AC100V, 50Hz or 60Hz, 0.5kVA
Dimensions	W300 x D530 x H480mm	W300 x D600 x H480mm
Weight	Approx. 50kg	
Related standards	ISO 2758 (Paper & Cardboard) JIS P 8112 (Paper & Cardboard) JIS L 1018 (Woven fabric) JIS K 6328 (Rubber-coated cloth)	ISO 2759 (Paper & Cardboard) JIS P 8131 (Paper & Cardboard) JIS L 1096 (Woven fabric) JIS K 6328 (Rubber-coated cloth)

5. Abrasion

■No.430 Rotary Abrasion Tester, model TS-2



Left: Rotary Abrasion Tester model TS-2

Right: Refacer model TSR-1 (Optional)

The TOYOSEIKI **Rotary Abrasion Tester** evaluates abrasive level in contact side with two abrasive wheels by loss in mass, thickness and etc. of the specimen.

Model	TS-2
Rotation speed	60rpm or 72rpm
Load	250, 500, 1000gf
Counter	6-digits
Standard abrading wheels provided	1 set of CS-10 or CS-17
Power requirement	Single-phase, AC100V, 50Hz or 60Hz, 1kVA
Dimensions	W275 x D410 x H500mm
Weight	Approx. 18kg
Related standards	JIS A 1453, K 5600, K 6264, K 7204 ISO 9352

6. Stiffness

■No.108 Digital Clark Stiffness Tester, model D



The TOYOSEIKI **Digital Clark Stiffness Tester** evaluates stiffness of paper etc. by simulating the state of folding by self weight.

Model	D
Rotational speed	1.0rpm±0.1rpm
Specimen size	Length: 75 to 300mm Width: 15 to 50mm Thickness: 0.8mm or less
Power requirement	Single-phase, AC100V, 50Hz or 60Hz, 0.5VA
Dimensions	W270 x D420 x H470mm
Weight	Approx. 20kg
Related standard	JIS P 8143

■No.155 Taber type Stiffness Tester, model D



The TOYOSEIKI **Taber type Stiffness Tester** evaluates stiffness of comparatively hard materials such as paperboard etc.

Model	D
Dimensions of sample	Width: 30 to 40mm Length: 70mm Thickness: 3.2mm or less
Bending angle	■ 15° ■ 7.5°
Bending speed	170 to 210° / min.
Measuring range	■ 9.81mN·m (Bending angle 15°) ■ 49.1mN·m (Bending angle 15°) ■ 98/1mN·m (Bending angle 15°)
Power requirement	Single-phase, AC100V, 50Hz or 60Hz, 0.5kVA
Dimensions	W265 x D415 x H465mm
Weight	Approx. 25kg
Related standards	JIS P 8125-2 ISO 2493-2

■No.581 Loop Stiffness Tester, model DA



The TOYOSEIKI **Loop Stiffness Tester** evaluates stiffness of thin-film materials by measuring resistance when collapse in loop shape occurs.

Personal computer and software is option

Model	DA
Dimensions of sample	Length: 90 to 180mm Width: 6 to 25.4mm Thickness: 100 to 250μm
Loop length (Effective length)	50 to 120mm
Load range	5000mN (x1) 500mN (x10) 50mN (x100)
Compression rate	3.3mm/s
Output	RS-232C Recorder output (Option)
Power requirement	Single-phase, AC100V, 50/60Hz, 0.3kVA
Dimensions	W360 x D490 x H310mm
Weight	Approx. 25kg

■No.826 Digital Gurley Stiffness Tester, model GS-3



The TOYOSEIKI **Digital Gurley Stiffness Tester** evaluates stiffness of comparatively weak materials such as paper etc.

Model	GS-3
Measuring range	0.01 to 5000mN (Pendulum angle 0.3° to 55°)
Length of sample (Based on JAPAN TAPPI No.40)	■ 25.4mm ■ 38.1mm ■ 63.5mm ■ 88.9mm ■ 114.3mm
Width of sample (Based on JAPAN TAPPI No.40)	■ 12.7mm ■ 25.4mm ■ 50.8mm
Weight	■ 5g ■ 25g ■ 50g ■ 200g
Weight installation distance (Based on JAPAN TAPPI No.40)	■ 25.4mm ■ 50.8mm ■ 101.6mm
Driving motor	Stepper motor
Arm speed	2 rpm
Angle measurement	Unloaded type encoder (Resolution 0.1°)
Interface	RS-232C x 1
Operating panel	LCD touch-screen
Power requirement	Single-phase, AC100 to 240V, 50/60Hz, 0.2kVA
Dimensions	W300 x D300 x H550mm
Weight	Approx. 15kg
Related standards	JIS L 1085, L 1096, L 1913 JAPAN TAPPI No.40 TAPPI T 543

7. Folding

■No.530 MIT type Folding Endurance Tester



The TOYOSEIKI **MIT type Folding Endurance Tester** evaluates folding endurance of paper, plastics, leather, foil etc. by repeatedly folding specimen on both sides.

Model	S-2	D-2
Loading system	Spring	Dead weight
Load	4.9 to 14.7N	Please select one kind ■2.45 to 19.6N (2.45N steps) ■0.98 to 9.8N (0.98N steps)
Folding angle	45°, 90°, 135° (left/right)	
Folding speed	90, 175cpm	
Chuck (Standard)	Radius of edge: R0.38mm Clearance: 0.25mm	
Counter	9999999 times	
Power requirement	Single-phase, AC100 to 230V, 50/60Hz, 0.5kVA	
Dimensions	W280 x D320 x H450mm	
Wight	Approx. 25kg	
Related standards	ISO 5626 JIS P 8115, JIS R 3420, JIS C 5016 ASTM D2176	

8. Puncture

■No.195 Film Impact Tester, model FT-DG

Puncture Impact tester for measurement of impact resistance of film etc.



The TOYOSEIKI **Film Impact Tester** evaluates puncture impact strength of thin material such as film etc.

Model	FT-DG
Capacity	■0 to 1.5J ■0 to 3J (2 ranges)
Impact head	Hemisphere shape (2 kinds) ■Ø12.7mm ■Ø25.4mm
Display	Digital (Touch screen)
Temperature range	N/A
Power requirement	Single-phase, AC100V, 50/60Hz, 0.2kVA
Compressed air requirement	0.3 to 0.5MPa (For pneumatic chuck option)
Dimensions	W740 x D300 x H750mm
Weight	82kg
Related standards	N/A

9. Smoothness

■No.168 Digi-Bekk Smoothness Tester, model DB-2

Bekk type Smoothness Tester for paper



The TOYOSEIKI **Digi-Bekk Smoothness Tester** evaluates smoothness from the rate at which air leaks out from the space in between the surface of specimen and the smooth glass surfaces.

Model	DB-2
Indication of vacuum	0 to 55.00kPa
Attainable of vacuum	55kPa
Vacuum setting	0.01kPa steps
Power requirement	Single-phase, AC100V, 50Hz or 60Hz, 0.2kVA
Dimensions	W510 x D320 x H390mm
Weight	Approx. 28kg
Related standard	JIS P 8119

10. Air Permeability

■No.158 Gurley type Densometer, model G-B3C



The TOYOSEIKI **Gurley type Densometer** measures the porosity of paper and other materials by forcing air through it. Transit time (air permeability resistance) of 100cc and ISO air permeability can be displayed by automatically detecting the falling rate of the pressure cylinder.

Model	G-B3C
Sample clamping system	Constant load system using lever operation [Sample: 0 to 1mm, approx. 200N (20kgf)]
Outer cylinder	Internal dia. 82.6mm, Height 254mm
Inner cylinder	Internal dia. 74mm, External dia. 76.2mm, Height 254mm Mass $567 \pm 0.5\text{g}$
Gasket	Internal dia. 28.6mm, External dia. 34.9mm
Air permeation volume	Max. 350ml Scale 0, 25, 50, 75, 100, 150, 200, 250, 300, 350ml
Air transmission hole diameter	$\varnothing 28.6 \pm 0.1\text{mm}$
Oil used	Machine oil, ISO VG10
Air permeation counter	■ Scale detection sensor: Reflection type optical fiber sensor ■ Permeation time range: 1.0 to 9999.9sec. ■ Measuring mode: Cumulative time(s) ■ *Indication mode: Air resistance(s/100ml), ISO air permeability($\mu\text{m}/\text{Pa} \cdot \text{s}$) <i>*Note: Possible to change after measurement. It displays cumulative time during measurement.</i> ■ Air permeation volume ranges: 25, 50, 100, 200, 300ml (5 ranges) ■ Interface: RS-232C
Power requirement	Single-phase, AC100 to 240V, 0.5A
Dimensions	W220 x D225 x H560mm
Weight	Approx. 22kg
Related standards	ISO 5636-5 (JIS P 8117) JIS L 1913

11. Vapor Permeability

■No.188 Moisture Pervious Cups



The TOYOSEIKI **Moisture Pervious Cups** are used to evaluate the water permeability of the material. Evaluation is made by the differential in weight and determining the amount of water vapors passing through a specific area of membranous sample in 24 hours.

Area vapor passes through	28cm ² (Ø60mm)
Diameter of specimen	Ø64mm
Accessories	■Cup: 10 ■Ring: 10 ■Guide: 1 ■Weight: 1 ■Cup base: 1 ■Sample cutter: 1
Dimensions	W500 x D250 x H150mm
Weight	Approx. 5kg
Related standards	JIS Z 0208 ISO 2528

12. Thickness

■No.201 Digi-Thickness Tester



The TOYOSEIKI **Digi-Thickness Tester** measures thickness of paper etc. according to JIS.

Measuring range	Min. 0.001mm, Max. 8.0mm
Automatic presser up/down speed	2.5 to 20.0sec. (Variable)
Printer	Print items: ■ Number of specimens ■ Max. value ■ Min. value ■ Average value ■ Standard deviation ■ Number of NG ■ NG ration ■ Histogram
Anvil (for paper)	Ø16.00mm±0.5mm (JIS P 8118)
Measurement pressure (for paper)	100kPa±10kPa (JIS P 8118)
Power requirement	Single-phase, AC100V, 50/60Hz, 0.2kVA
Dimensions	W360 x D320 x H490mm
Weight	Approx. 30kg

13. Pulp, Sheet Former

■No.177 Standard Sheet Machine



The TOYOSEIKI **Standard Sheet Machine** can make a standard handmade paper sheet for testing with a small amount of pulp under a constant condition.

Note: Metal rack shown is option

Model	D158-S (Sheet Forming Device)
Sheet forming area	Ø158mm
Screen wire (Standard)	106µm (Approx. 150mesh)

Model	E-1 (Air Sheet Press)
Press system	Pneumatic
Max. pressure	410kPa
Stroke	Max. 150mm (Approx.)
Compressed air supply	0.4MPa

Model	D158-D (Sheet Drying Device)
Power supply	Single-phase, AC100V, 50/60Hz, 0.05kVA

Model	D158-S (Set of D158-S, E-1 and D158-D)
Dimensions	W1300 x D600 x H1400mm (Including optional metal rack)
Weight	Approx. 120kg (Including metal rack)

14. Pulp, Sheet Press

■No.179 Auto Sheet Press



The TOYOSEIKI **Auto Sheet Press** is used for test handmade paper adjustment method and is possible to program pressure and pressing time.

Press plate dimensions	270 x 270mm
Max. pressure	0.88MPa
Stroke	Max. 95mm
Power requirement	Single-phase, AC100V, 50Hz or 60Hz, 0.3kVA
Dimensions	W420 x D470 x H660mm
Weight	Approx. 100kg
Related standard	JIS P 8222



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