

VPA

Versatile Peel Analyzer



High-throughput measurements of peel tests under any angle from 0 to 180° using Kyowa's proprietary method and self-developed analysis software

■ What is a peel or adhesion test?

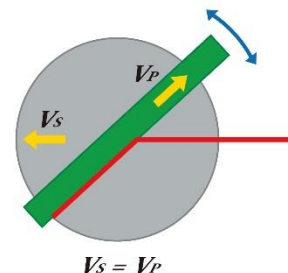
Pressure-sensitive adhesive tapes (PSA) are not merely known as articles of daily use but play a significant role in various forefront industries such as flat panel display, semiconductor, and solar battery fabrication as both constitutive parts and integral part of their production process. The performance of PSA can be characterized by peel adhesion, shear resistance and tack tests. Among them, peel adhesion tests are conducted widely to make an objective appraisal with quantitative evaluation following ISO 8510-1 and 2, the 90° and 180° peel tests, respectively. The 180° peel test tends to be slightly affected by the thickness and elasticity of the PSA tape, and the 90° peel test may experience elongation and sagging of the tape due to the rather complicated structure of the jigs.

Demands on peel adhesion, peel angle and peel rate for the optimization of adhesive tapes used in production processes vary widely depending on the applications.

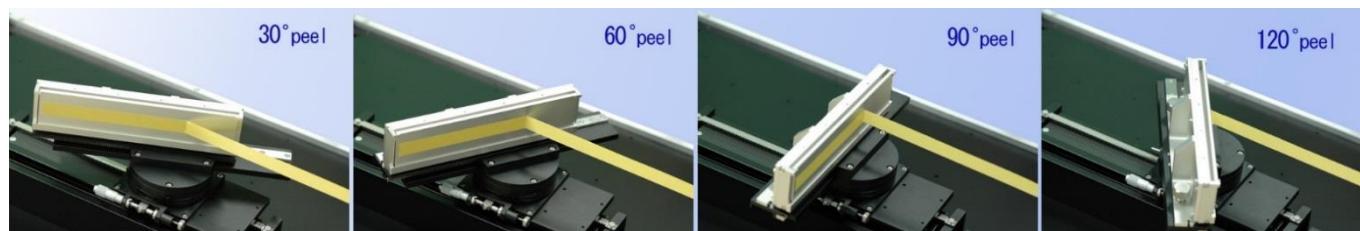
■ Concept of peel testing with Kyowa's Versatile Peel Analyzers

The computer-controlled Versatile Peel Analyzers with their unique Flat Plate Cross Stage method (Patent No. 4717156) can easily perform peel tests at any peel angle from 0 to 180° under a certain peel rate with only simple settings.

The most remarkable part of the VPA is its flat specimen stage, which sits on a rotary table. With help of this rotary table the peel angle can be easily and swiftly adjusted from 0 to 180° without using any jigs or tools. The employed synchronized actuator mechanism enables a constant peel rate and peel angle, respectively, during stage travel. No complex adjustments nor calculations are required.



Peel angles can be changed quickly and easily without any extra jigs or tools



■ Examples of data

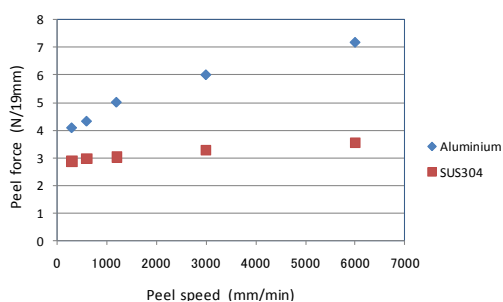


Fig.1 Peel forces at different peel rates between polyester adhesive tape and metal plates

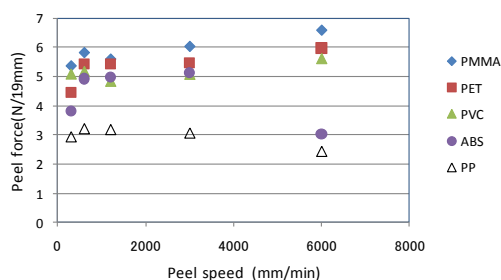


Fig.2 Peel forces at different peel rates between polyester adhesive tape and polymer plates

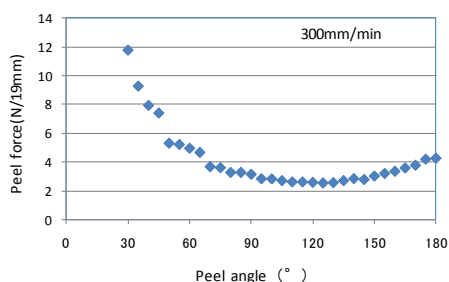


Fig.3 Peel forces at different peel angles between polyester adhesive tape and SUS304 plate

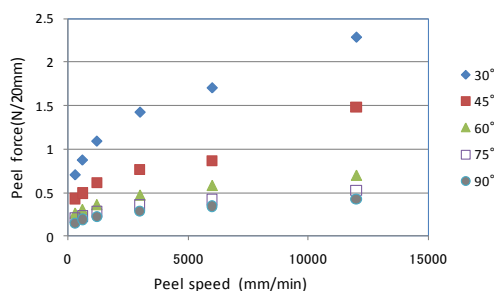
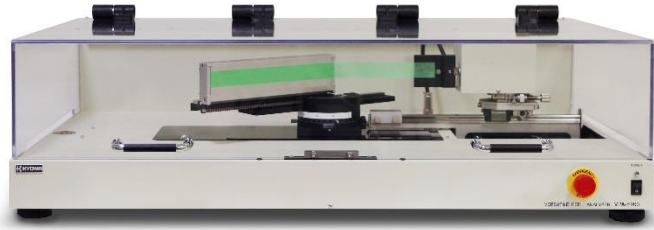


Fig.4 Peel forces at different peel rates and angles between label sheet and release paper

■ Product lineup

Standard model - VPA-H200

The standard model is a high-speed peel tester which due to its specimen stage and long stage travel distance is applicable to larger sample sizes.

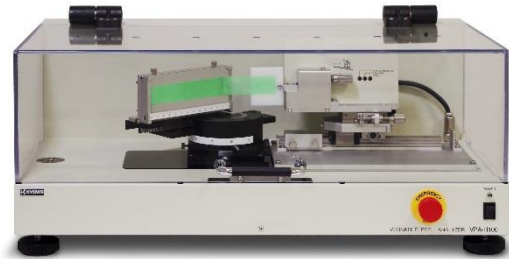


Features of the VPA-H200

- Available load cell units ranging from 0.1N to 100 N rated capacity (full scale)
- Measurements of peel strength as low as 0.001 N can be performed
- Peel area of max. 40 x 200 mm
- Stage travel distance of 200 mm
- Analysis of peel strength dependent on peel angle and peel speed
- Peel angles between 0 and 180°
- Peel rates from 3 to 30000mm/min
- Dimension of instrument (WxDxH): 910 x 550 x 270mm

Compact model - VPA-H100

The compact model can accommodate the same unit cell units and features and provides the same functions as the standard model, but is limited in terms of maximum peel rate, stage travel distance, and applicable sample size.



Features of the VPA-H100

- Available load cell units ranging from 0.1 N to 100 N rated capacity (full scale)
- Measurements of peel strength as low as 0.001 N can be performed
- Peel area of max. 40 x 100 mm
- Stage travel distance of 100 mm
- Analysis of peel strength dependent on peel angle and peel speed
- Peel angles between 0 and 180 °
- Peel rates from 3 to 12000 mm/min
- Dimension of instrument (WxDxH): 620 x 400 x 270mm

■ Applications


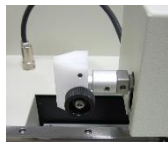
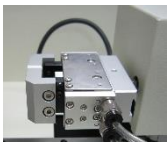






- Effects of peel angles and peel rates on peel behavior of PSA tapes, packaging films, labels, release papers/films
- Peeling properties between carbon fiber prepregs and release papers
- Releasing strength between protective films and critical surfaces such as phone displays, glasses, metals, carpets
- Peel/bond strength between laminated film layers, holograms on plastic cards, coating films on glass or metal, adhesive tapes on wafers and frames
- Adhesive strength between thin-film electrodes and current collectors in lithium-ion batteries
- Adhesive strength between ceramic green sheets and carrier films for laminated ceramic capacitors
- Visualization/observation of the peeling process from above and behind the adherend
- Low force tensile strength tests of various films

■ Specifications

		VPA-H100	VPA-H200
Measurement method		Flat Plate Cross Stage Method	
Rated capacity (full scale) load cell units		0.1 N, 1 N, 5 N, 10 N, 50 N, 100 N	
Maximum measuring load		90 % of the load cell's rated capacity	
Display resolution of load cell units	0.1 N, 1 N, 5 N, 10 N 50 N, 100 N	0.001 N 0.01 N	
Adherend sample shape and dimensions (WxL)		Flat sheet, plate or strip 50 x 130mm, maximum thickness: 3 mm	Flat sheet, plate or strip 50 x 230mm, maximum thickness: 3 mm
Max. peel area (WxL)		40 x 100 mm	40 x 200 mm
Stage travel speed range (V_s)		3 to 12000 mm/min	3 to 30000 mm/min
Max. stage travel distance (D_s)		100 mm	200 mm
Default sampling rate ¹⁾		Every 0.20 mm	Every 0.25 mm
Peel rate (V_p)		$V_p=V_s$ (Peel rate=Stage travel speed) The peel rate is independent of the peel angle	
Peel rate dependency		Measurement of one peel rate or gradually changed peel rates within one measurement cycle	
Peel angle dependency		Measurement of any peel angle between 0 and 180 °	
Analysis contents		Peel force versus peel distance, peel force versus peel rate, peel force versus peel angle	
Instrument dimensions (WxDxH)		620 x 400 x 270 mm	910 x 550 x 270 mm
Instrument weight		25 kg	41 kg
Power supply		AC100 to 240 V, 50/60 Hz, 25 W, 65 VA	
Operating environment		Temperature: +15 to +35 °C, humidity: 30 to 80 %RH (non-condensing) Positioned away from sources of electrical noise and vibration	

¹⁾ For both models, the sampling rate can be set to 0.10 mm for peel rates up to 6000 mm/min and to 0.05 mm for peel rates up to 3000 mm/min.

■ Optional accessories and customized solutions

Heater type temperature-controlled peel stage set	Different types of peel test grips
 <p>Ambient to +180 °C for use with VPA-H100</p> <p>Ambient to +180 °C for use with VPA-H200</p>	 <p>Manual peel test grips</p>  <p>Pneumatic peel test grips</p>
Manual hand roller for preparing PSA tapes, load: 2.0kg	Available load cell units: 0.1 N, 1 N, 5 N, 10 N, 50 N, 100 N
	 <p>0.1 N, 1 N</p>  <p>5 N, 10 N</p>  <p>50 N, 100 N</p>
Specially designed sample stage to mount bicycle wheels	Specially designed sample stage and height adjustable cell unit
 <p>Measurement of adhesive strength of tapes on bicycle rims</p>	 <p>For the use of wide-width adherends and tapes</p>

For detailed information, please contact our sales partner or us directly at +81-48-483-2629 or at overseas-sales@face-kyowa.co.jp.

The specifications and designs are subject to change without notice.

1906



<http://www.face-kyowa.com>

Kyowa Interface Science Co., Ltd.

5-4-11 Nobitama, Niiza City, Saitama 352-0011, Japan

(ES) Equipements Scientifiques SA - Département Bio-Tests & Industries - 127 rue de Buzenval BP 26 - 92380 Garches
Tél. 01 47 95 99 90 - Fax. 01 47 01 16 22 - e-mail: bio@es-france.com - Site Web: www.es-france.com