

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?

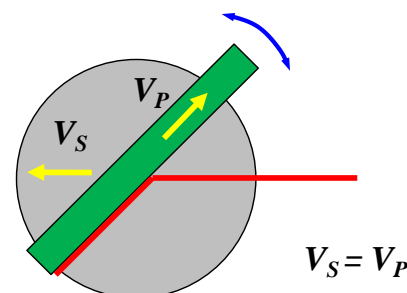
Pressure-sensitive adhesive tapes (PSA) are not merely known as articles of daily use but play a significant role in various forefront industries such as flat panel display, semiconductor, and solar battery fabrication as both constitutive parts and integral part of their production process. The performance 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.

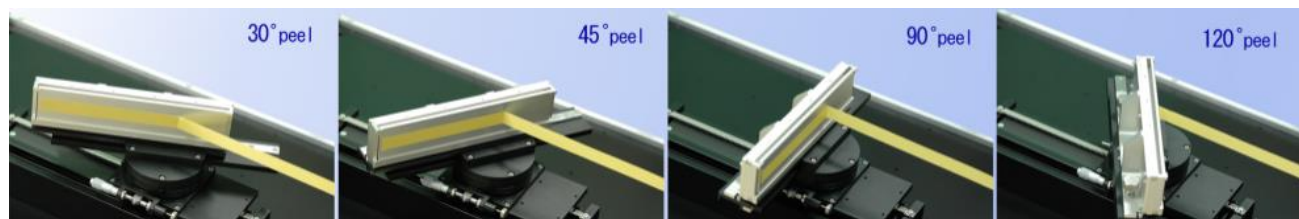
■ Concept of peel testing with Kyowa's Versatile Peel Analyzers

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

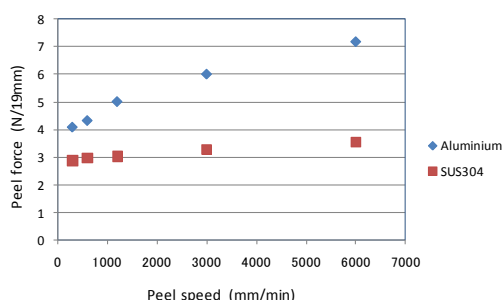


Fig.1 Peel forces at different peel rates between polyester adhesive tape and metal plates

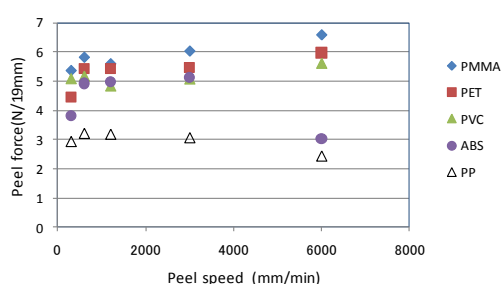


Fig.2 Peel forces at different peel rates between polyester adhesive tape and polymer plates

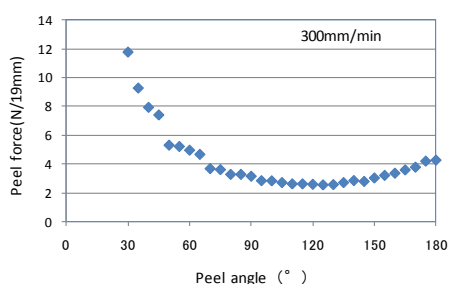


Fig.3 Peel forces at different peel angles between polyester adhesive tape and SUS304 plate

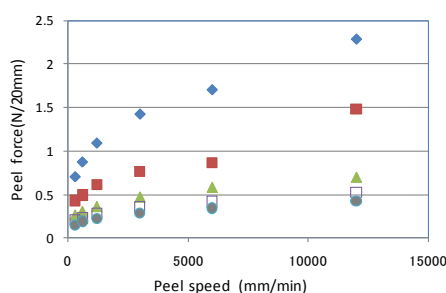
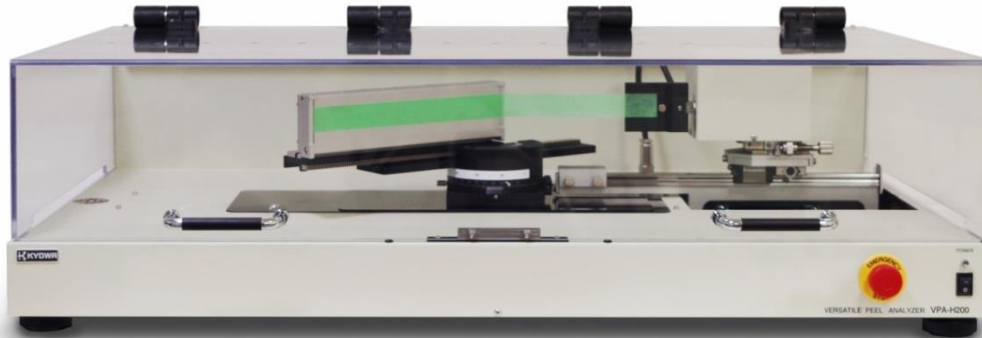


Fig.4 Peel forces at different peel rates and angles between label sheet and release paper

■ Product lineup

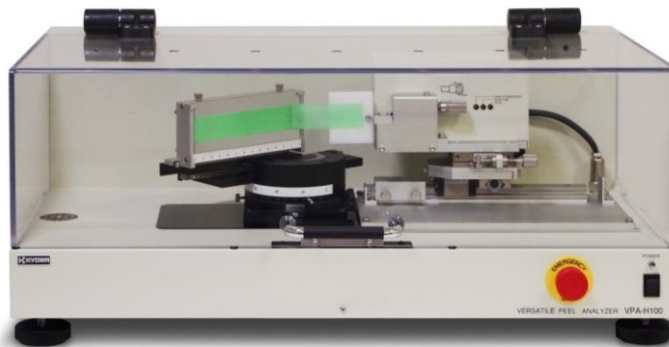
VPA-H200

Higher peel rate application model up to 30,000 mm/min (500 mm/s)



VPA-H100

Compact designed model of foot print only 620(W) x 400(D) mm



■ Features

- Unique data obtaining: Dependency of peel forces upon peel angles
- The peel angle can be changed between 0 and 180° freely and simply without using tools.
- 6 kinds of load cell units ranging from 0.1N to 100N are available optionally.
- Ideal design that stage travel distance equals to peel distance, which can simplify setting measurement conditions.
- High peel rate measurement max. 30,000 mm/min (500 mm/s) by VPA-H200
- Can measure variable peel rate in one stage stroke and draw spectrum of peel force against peel rate
- Can measure peel force as low as 0.001N
- Camera system at option presents visual information on peeling phenomena







■ Applications

- Typical peel force tests of 90 degrees and 180 degrees for PSA tapes
- Effects of peel angles and peel rates of PSA tapes, protective films, labels, release papers/films
- Small peel force such as release papers, release paper/films
- Tiny peel force likely applicable to transfer films
- Adhesive strength of thin-film electrode on foil of rechargeable batteries
- Adhesive strength between ceramic green sheets and carrier films for laminated ceramic capacitors
- Peeling properties between Prepreg carbon fibers and release papers
- Low force tensile strength tests of various films

■ Specifications

	VPA-H200	VPA-H100
Measurement method	Flat Plate Cross Stage Method	
Load cell units & Rated capacity (full scale)	100N, 50N, 10N, 5N, 1N, 0.1N	
Display resolution	100~50N load cell units: 0.01N, 10~0.1N load cell units: 0.001N	
Adherend sample shape and dimensions (WxLxT)	Flat plate, 50 x 230 x 1 mm (standard attachment) Thickness max: 3 mm	Flat plate, 50 x 130 x 1 mm (standard attachment) Thickness max: 3 mm
Size of peel area of sample (WxL)	40 x 200 mm	40 x 100 mm
Stage travel speed (Vs)	3~30,000 mm/min	3~12,000 mm/min
Stage travel distance (Ds)	Max. 200 mm	Max. 105 mm
Data sampling rate	every 0.250mm travel	every 0.200mm travel
Operating environment	Temperature: +15 to +35°C, humidity: 30 to 80%RH (non-condensing)	
Peel rate (Vp)	$V_p=V_s$ (Peel rate=Stage travel speed) Peel rate is independent of peel angle	
Peel rate dependency	Measurement of step change of peel rate in one stroke of stage	
Peel angle dependency	Measurement of any angle between 0 and 180° *Possible angle may be restricted due to sample thickness, material property, etc.	
Analysis contents	Peel force vs Peel distance, Peel force vs Peel rate, Peel force vs Peel angle	
Safety functions to stop stage travel	Limit of travel distance, Overload (beyond 90%) of load cell, Emergency button	
Instrument dimensions (WxDxH)	910 x 550 x 270 mm	620 x 400 x 270 mm
Weight (when installing 100N load cell unit)	About 41kg	About 25kg
Power supply	AC100-240V, 50/60Hz, 25W, 65VA	

■ Optional accessories and customized solutions

<p>Heater type stage system</p>  <p>ambient to +180°C for use with VPA-H100</p> <p>ambient to +180°C for use with VPA-H200</p>	<p>Equipment for tensile strength testing</p>  <p>applicable only with 50N and 100N load cell units</p>
<p>Manual hand roller (pressure roller) 2.0kg</p> 	<p>Available load cell units: 0.1N, 1N, 5N, 10N, 50N, 100N</p>  <p>0.1N 10N 100N</p>
<p>Specially designed sample stage to mount bicycle wheels</p>  <p>Measurement of adhesive strength of tapes on bicycle rims</p>	<p>Specially designed sample stage and height adjustable cell unit</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.

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