

# NDG5

## Puncture Strength Tester

This testing machine measures the *piercing strength* required for a needle to penetrate a sample. It is to measure rupture strength by *applying a vertical force*, used for testing physical properties of battery separators.

The NDG5 can be used to evaluate the strength of film inside lithium-ion batteries (separators) and to measure the strength required to pierce packaging materials such as food packaging films.

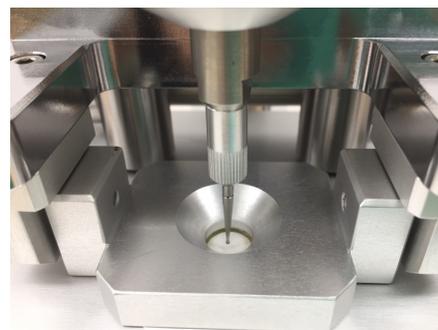
- Measurement Examples**
- Strength evaluation for separators inside lithium-ion batteries
  - Piercing strength evaluation for food packaging films



## FEATURE

### ● Specialized needle

Designed with separator measurement in mind (size:  $\phi 1$ , 0.5R tip shape)

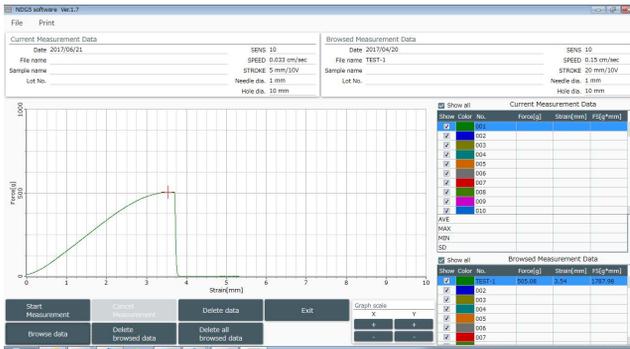


\* The photo shows a needle with a holder.  
Holder is not included in a single needle purchase.

SYSTEM CONFIGURATION DIAGRAM / MEASUREMENT DATA

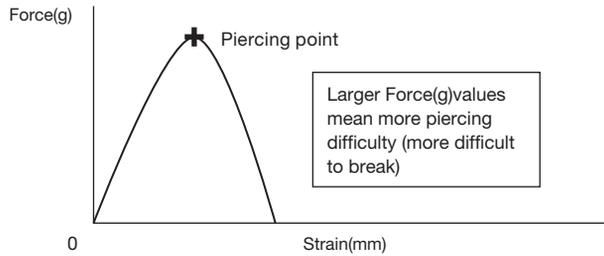


Sample Measurement Software Screens



▲ Piercing point

Obtainable Data



Force(g) = Penetrating power  
 Strain(mm) = Amount of displacement  
 FS(g·mm) = Load to penetration (Force × Strain)

\*Larger Force (g) values mean more piercing difficulty (more difficult to break)  
 \*Larger Strain (mm) values mean more piercing difficulty (more stretchy)  
 \*Larger FS (g·mm) values mean more piercing difficulty (more difficult to break and more stretchy)

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<b>Dimensions/Weight (approx.)</b>	Measuring unit: W230 × D230 × H460 (mm) / 13 kg Amplifier: W180 × D400 × H400 (mm) / 13 kg
<b>Power source</b>	100 VAC, power consumption: 20 W Max.
<b>Measurement environment temperature and humidity</b>	20 to 30°C / 50 to 70% RH. (No condensation.) Temperature and humidity should be kept constant during measurement. (Standard temperature and humidity conditions: 20°C / 65% RH) *The instrument should be located to minimize influence from wind or vibrations.
<b>Load detection</b>	Detector: Ring-type detector with differential transformer Load (full scale): Switchable between 4 ranges (100 gf, 200 gf, 500 gf, 1000 gf) Accuracy: ±0.5% or less of full scale
<b>Displacement detection</b>	Detector: Potentiometer Displacement quantity: Max. 20 mm Accuracy: ±0.5% or less of full scale

<b>Needle diameter</b>	1.0 mm
<b>Sample diameter after setting the sample</b>	10 mm
<b>Displacement rate</b>	Standard measurement: 0.02 mm/sec <1 mm/50 sec> High-sensitivity measurement: 0.0067 mm/sec <1 mm/150 sec> Other rates can be specified by settings.
<b>Measuring movement</b>	Load control system Displacement control system The above 2 systems are switchable
<b>Sample size</b>	Dimensions: 15 x 15 mm (min.) Thickness: 1mm (max.)

**⚠ Precaution** For safety use, please read the operation manual / the instruction carefully and thoroughly before using the tester.

Specification details recorded here are subject to change without notice. We appreciate your understanding.

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