

# KES-F7

## Thermo Labo

The sensation of coldness or warmth when skin is touching an object, is referred to as the “coldness and warmth feeling”, which varies depending on the amount of heat transferred from the skin to the object. This device measures such feeling by evaluating the “ $q_{max}$ ” value (peak heat flux).

The KES-F7 Thermo Labo can be used to evaluate such products as bedding material meant to offer a feeling of coldness in summer, and underwear material meant to offer contact warmth in winter.

### Measurement Example

- Evaluation of mattress pad's feeling of coolness,
- Evaluation of coolness of cooling gel sheet.
- Thermal sensation measurement for underwear,
- Automotive interior product texture evaluation,
- Evaluation of refreshing properties of cosmetics



## FEATURES

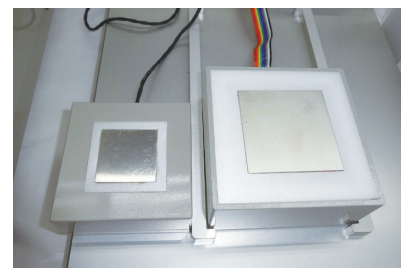
### ● A design that mimics the human sense of actually touching an object

The load and contact area of the KES-F7's heat plate, which is brought into contact with the target sample, is designed to imitate the sensation of touching an object by hand, allowing for more realistic measurements of maximum heat transfer amounts.

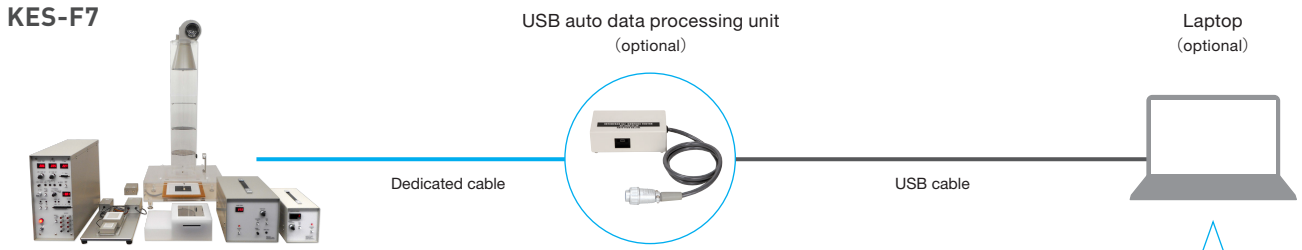
### ● Also able to measure thermal conductivity and heat retention properties (with optional accessories)

**Thermal conductivity :** With constant thermal conductivity measurement, the ease at which heat is transmitted from a heat plate with a constant temperature (30°C) through a sample to another heat plate with a separate constant temperature (20°C).

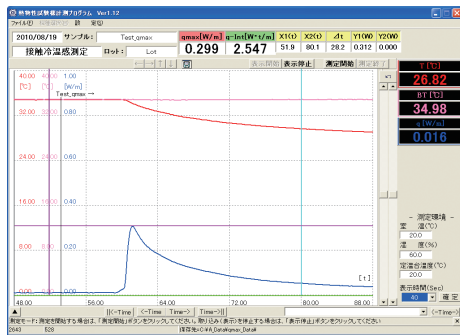
**Heat retention properties : (optional accessory)** The sample is set on a heat plate with a constant temperature (room temperature plus another 10°C) and is left in contact with the air. A constant wind is then applied continuously to the sample surface. The amount of heat lost through the sample is then measured in order to calculate the heat retention rate (%). Measuring methods include a dry method that assumes direct contact is made between dry skin and clothing and a wet method that assumes contact is made between sweaty skin and clothing.



SYSTEM CONFIGURATION DIAGRAM / MEASUREMENT DATA



Sample Measurement Software Screens



▲ Thermal Properties ( $q_{max}$ )

Obtainable Data

Item	Characteristic value	Description	Reading the data
Thermal Properties	$q_{max}$	Peak heat flux	(with selection switch set to Cool) Higher values mean a colder feeling
	k	Thermal conductivity	Higher values mean heat is more easily transferred
	%	Heat retention properties	Higher values mean higher heat retention properties

KES-F7 Thermo Labo

<b>Dimensions/Weight (approx.)</b>	<ul style="list-style-type: none"> <li>Thermo Labo (qmax / thermal conductivity measurement unit): W230 × D360 × H80 (mm) / 3 kg *With BT-box and T-box set on base plate</li> <li>Amplifier: W180 × D400 × H400 (mm) / 15 kg</li> <li>Heat Retention Property Measuring Unit*: Wind Tunnel Unit: W460 × D320 × H1100 (mm) / 7 kg Wind Tunnel Amplifier: W140 × D240 × H180 (mm) / 2.5 kg</li> <li>Thermo Cool: W180 × D180 × H110 (mm) / 2.5 kg Thermo Cool Amplifier: W230 × D310 × H220 (mm) / 5 kg</li> </ul>
<b>Power source</b>	100 VAC (Thermo Labo unit) Max. power consumption: 50W (Wind tunnel unit) Max. power consumption: 20W* (Thermo Cool unit) Max. power consumption: 20W
<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.

\*Optional accessory: Heat Retention Property Measuring Unit (Wind Tunnel Unit, Wind Tunnel Amplifier)

<b>Measurement unit configuration</b>	T-Box: (T-plate 3 × 3 cm) 5 cm BT-Box: (BT plate 5 × 5 cm) 10 cm BT-Box: (BT plate 10 × 10 cm)*
<b>Temperature display</b>	Unit: Degrees Celsius Min. display: 0.1°C Max. temperature set point: 40°C
<b>Evaluated coldness/warmth feeling value</b>	$q_{max}$ [W/cm <sup>2</sup> ]
<b>Heater control method</b>	Output in voltage proportional to temperature difference
<b>Heat-loss display</b>	Max. usable range (200mW range): Approx. 200mW Max. usable range (2W range): Approx. 2W Max. usable range (20W range): Approx. 10W * Do not use the 200W range.
<b>Measurement range</b>	Thermo Labo unit: Max. 10 W (stable measurable range: 3 W (1.2 kW/m <sup>2</sup> ) or less) Wind tunnel speed: Max. 1 m/sec* Thermo Cool: Min. temperature setting (5°C) to room temperature
<b>Sample size</b>	Dimensions: 180 × 180 mm, Thickness: 2 mm (max.)

**⚠ Caution** 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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