



# SWEATING GUARDED HOTPLATE

Skin Model

# Measures Thermal Properties and Water Vapor Resistance

Wear comfort has been cited as the most important property of clothing demanded by users and consumers according to recent studies. It is a major factor in determining the success or failure of products brought to market and therefore it is critically important to understand the components that influence a fabric's comfort properties.

Two of the most significant factors contributing to product comfort are the overall thermal resistance and the moisture transmission properties. The SDL Atlas Sweating Guarded Hotplate, also referred to as the 'skin model', accurately and consistently measures the transfer of both heat and moisture from the body and through a garment.

## Sweating Guarded Hotplate

Often referred to as the "Skin Model", the Sweating Guarded Hotplate measures thermal properties and water vapor resistance of fabrics and other materials under steady state conditions. The test simulates the heat and mass transfer process which occurs next to human skin.

The SDL Atlas Sweating Guarded Hotplate measures heat flow and moisture transfer from the calibrated test plate, heated to a skin surface temperature of 35°C, through the test sample. The instrument simulates both dry and wet skin conditions to give the sample's comfort profile. The measurements given provide a picture of the test sample's permeability, breathability, and heat loss from sweat evaporation. The instrument is built into a sophisticated purpose-designed climate chamber to ensure the most rigid control possible, providing the utmost confidence in the test's accuracy. Both the humidity guard and hotplate are made porous (sintered) bronze, giving the most accurate simulation of human skin.

### STANDARDS:

ASTM D1518

ASTM D1518-11a Option 2

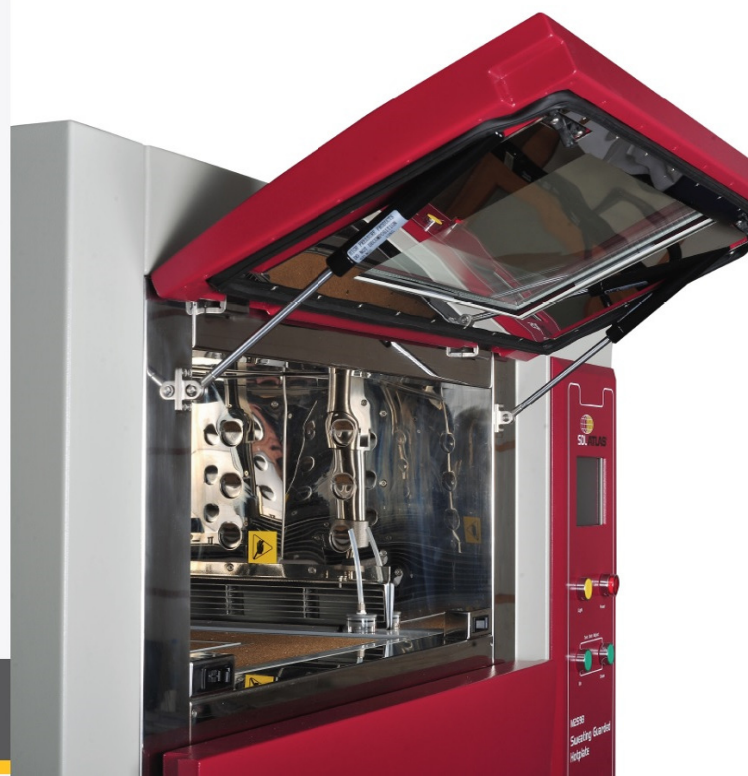
ASTM F1868

EN 343

ISO 11092

GB/T 11048

The Sweating Guarded Hotplate correlates with results from Hohenstein Institute Skin Model

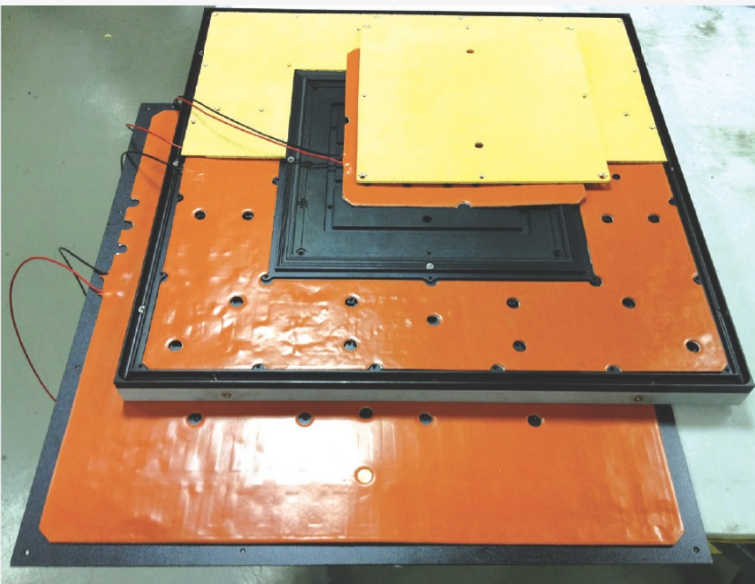


# Instrument Features



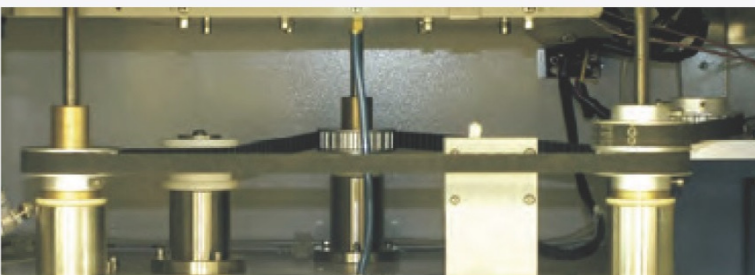
*Sintered hotplate and guard*

- The humidity guard and hotplate are made of sintered porous bronze giving the most accurate simulation of human skin
- A 105 mm guarded plate provides a lateral heat barrier to ensure that the measured heat flows vertically through the sample
- The grooved guard plate allows for simple and accurate sample loading



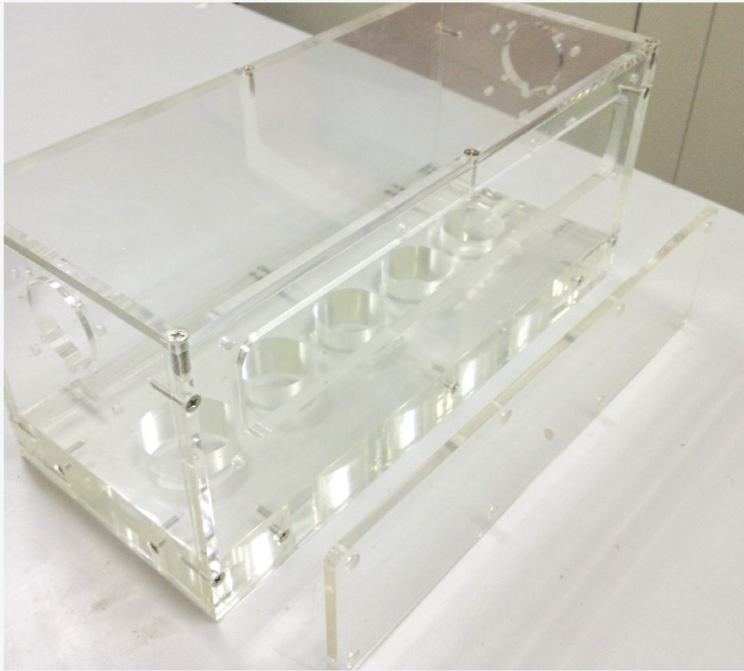
*Three-sectioned Hotplate construction*

- Three-section hotplate composed of a test plate, guard section, and bottom plate. Each electrically and independently maintains a constant temperature in the range of human skin temperature (33 to 36°C)
- Nine temperature measurement channels, 3 sensors in each section, work simultaneously to accurately control and measure the temperatures of the hotplate and guards



*Capable of measuring samples of up to 70 mm thick*

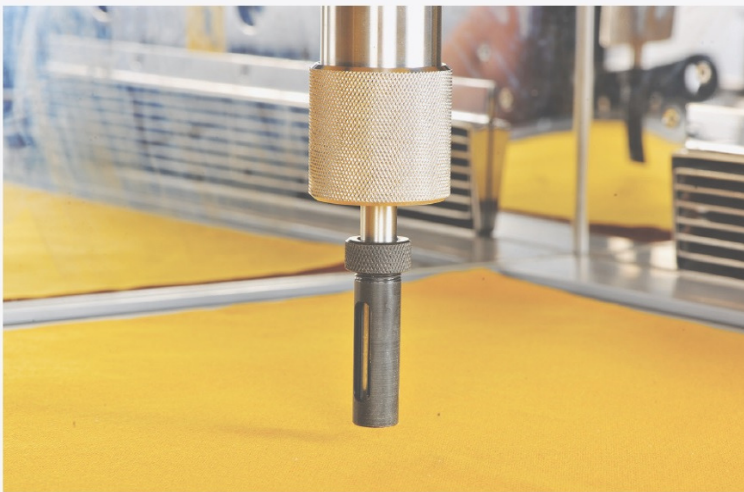
- Hotplate height is adjustable by motor drive that keeps the plate level
- Samples of different thicknesses can be tested while maintaining the specified gap between the airflow and sample surface



Humidity Chamber

## Purposed Built Conditioned Cabinet Controls and Monitors:

- Air Temperature
- Air Speed
- Relative Humidity
- Heater Power Consumption
- Extended temperature range controls allow the instrument to comply with ASTM D1518 Option 2
- Humidity system is designed for easy periodic cleaning which is important to test results



Air flow sensor positioned over the hotplate

- Air speed sensor located directly above the sample
- Other sensors for climate control
  - Relative Humidity
  - Ambient air Temperature

**SDL ATLAS SWEATING GUARDED HOT-PLATE**

Company: **SDL ATLAS** Operator: **SDL**  
 Date: **9/21/2015** Ref No: **SDL ATLAS**  
 Alpha: **0.0000** RCP: **0.0000**  
 Air Temp: **20.0** Air RH: **65.0**  
 Sample Description:  Air speed: **1.00**

SYSTEM CONDITIONS

Measuring unit temp (deg)	36.00	Measuring unit temp (deg)	
Thermal up temp (deg)	36.00	RET	RCT
Thermal down temp (deg)	36.00	Tolerance	
Air temperature (deg)	6.55		
Air speed (m/s)	34.9		35.1
Relative humidity (%)	65.25		

Based on ISO 15092

No	Time	Volts	Amps	Power	T.Mn	Watts	Temp Me	Temp Top	Temp Dwr	Temp Air	RH	Air Speed	Rct
1	1:17:04	25.400	0.607	0.154	556.442	0.065	27.21	27.17	29.01	29.90	76.90	0.98	0.8194
2	1:20:04	25.439	2.181	51.098	176.154	16.204	26.81	26.86	28.64	29.90	64.91	1.00	0.8092
3	1:47:00	25.436	2.179	51.087	161.579	9.457	35.50	34.98	34.98	29.90	64.90	1.00	0.8007
4	2:02:05	25.439	2.179	51.074	180.307	8.087	34.59	35.06	35.06	29.90	64.90	1.00	0.8084
5	2:17:03	25.440	2.178	51.052	153.328	9.259	34.69	35.06	35.06	29.90	64.90	1.00	0.8095
6	2:32:05	25.441	2.178	51.055	181.841	9.181	34.99	35.06	35.06	29.90	64.91	1.00	0.8094
7	2:47:04	25.445	2.179	51.063	185.262	9.378	35.50	35.06	34.98	29.90	64.90	1.00	0.8012
8	3:02:06	25.440	2.178	51.072	162.328	9.211	34.59	35.06	34.98	29.90	64.90	1.00	0.8000

Buttons: Delete Data, All Data, Right Data, Save result to Excel

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- A laptop computer with control & analysis software is included
- Easy control and clear reporting of all critical settings
- Red/Green indicators give confirmation of test conditions at a glance

# Standards

ASTM D1518-11a Option 2   ASTM F1868   EN 343   ISO 11092   GB/T 11048

# Product Specifications

Thermal Resistance	up to 2 m <sup>2</sup> K/W, resolution 0.0001
Vapor Resistance	up to 1000 m <sup>2</sup> Pa/W, resolution 0.0001
Max. Specimen Size	500 mm x 500 mm x 70 mm (thick)
Hot Plate	3 mm porous (sintered) bronze plate, 250 mm x 250 mm Fixed temperature control at 35 C ± 0.1 C
Guard Plate	3 mm porous bronze plate, 105 mm width Fixed temperature control at 35 C ± 0.1 C Immersed with water as vapor guard during Ret test
Enclosure	Conditioned air flows parallel to Hot plate and Guard plate Air duct height: 55 mm ± 3 mm above working platform Air temperature range: 8 C to 45 C ± 0.5 C Air humidity range: 35%RH to 85%RH ± 3%RH Air flow speed: 1.0 m/s ± 0.05 m/s, measured 15 mm above platform
Dimensions (Width x Depth x Height)	1260 cm x 950 cm x 1800 cm
Weight	500 kg
Power	230VAC, 50/60 Hz, 20A, Single Phase
Water	Deionized or Distilled Water
Cooling Media	Antifreeze
Environment	20 C ± 1 C, 65%RH ± 3%RH

# Standard Accessories

- M259B Sweating Guarded Hotplate Instrument
- Laptop computer with Windows and Office
- Sweating Guarded Hotplate Software
- Two units External Reservoir (10 liter bottles)
- One pack 540 mm x 540 mm Cellophane Sheet (250 pcs)
- One pack Edge Loss Foams 520 mm x 520 mm
- Manual Syringe
- CD for Instruction Manual
- One pack of Spare Fuses (32A & 10A x 2pcs, 0.5A x 1 pcs)

# Optional Accessories

- 202685    Calibrated Resin Board
- 301101    Installation, Set-up, Operation Training
- 106649    Edge Correction Foams (Pack of 10 thicknesses) 520 mm x 520 mm
- 106652    Cellophane Sheets (pack of 250) 540 mm x 540 mm

# Providing Confidence

For over 60 years, the SDL Atlas companies have been providing confidence in standard based testing through expertise and global partnering. Our customers can be assured that they are making informed decisions based on accurate test results.

SDL Atlas experts work closely with standards committees and retailers on development of standards. Our engineers develop instruments to meet these standards. Our service team calibrates the instruments to exacting UKAS and internal standards. High quality consumables that are consistent from batch to batch are also produced and distributed by SDL Atlas.

## Fabrics and Consumables

Consumables are a critical part of many textile tests. SDL Atlas produces and distributes a complete line of consumables. Each batch is thoroughly tested to ensure conformity and consistency from batch to batch.

Our consumables offerings include:

- Multifiber
- Cork Liners
- Abradents
- Phenolic Yellowing
- Detergents
- Ballasts
- Crocking Fabric

## Calibration & Service

- UKAS calibration
- ISO calibration
- Service support
- Factory trained representatives
- SDL Atlas service technicians
- Crocking Fabric



With UKAS accredited technicians located in Europe, Asia, and North America, we are prepared to support our customers in maintaining their investment and their confidence in their test instruments. SDL Atlas calibration certificates are accepted by all accreditors.

Providing confidence in standard based testing through expertise and global partnering.



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