THE WORLD'S MOST ADVANCED
INSTRUMENTS FOR TEXTILE AND BIOPHYSICAL TESTING

1D

PROTECTIVE TEST SYSTEM

THERMAL PROTECTIVE PERFORMANCE (TPP)

Will your material system protect against a 2nd degree burn? The Thermal Protective Performance (TPP) Test Device was developed to measure the time elapsed for convective and radiant heat to penetrate through a protective composite fabric system - measuring the resulting damage to human skin.

The TPP device features a heat source that consists of two propane burners and a 9-bulb quartz infrared heat lamp assembly. The system is automated by using a pneumatically actuated sample carriage, water-cooled shutter, and a mass flow controller. Additional benefits include three thermocouple inputs and an integrated sensor cooling stand for improved testing through-put.

System includes a PC laptop computer with ThermDAC data acquisition and control system with burn prediction. During testing, ThermDAC control software continuously records and displays a real-time graph of the average temperature rise, depicted as a curved line representing increasing temperatures as heat penetrates through the composite fabric materials to the sensor.

After the test is completed, results are automatically compared to the Empirical Performance Curve (Stoll Curve), which predicts a second degree burn to human skin as a function of heat and time. The point of intersection between sensor data and the Empirical Performance Curve provides the composite fabric's TPP rating.

Test Methods Supported

- **ISO 17492**
- **ASTM F2700** (ASTM F2700 is an updated version of ASTM D4108)
- **ASTM F2703,**
- **CAN/CGSB 155.20**
- **NFPA 1971, 1977, and 2112**

THERMAL PROTECTIVE PERFORMANCE (TPP) TEST DEVICE

TPP Specifications

- Up to 7.5 in x 7.5 in. (19 cm x19 cm) sample size
- Copper slug calorimeter sensors (ASTM or ISO)
- ± 0.75°C temperature measurement
- ± 3% radiant heat flux measurement
- Device Dimensions: 42 in. x 20 in. x 18 in. (107 cm x 51 cm x 46 cm)
- Space Requirements: 46 in. x 26 in. x 24 in. (117 cm x 67 cm x 61cm)
- Power Requirements: 208-265 VAC, 50/60Hz, Single-phase
- Maximum nominal current 20 Amps
- Compressed Air: Clean/dry air at 70-90 PSI, (145 PSI max)
- Cooling Water: Cooling water required, chiller or tap water source is acceptable
- Propane Requirement: Regulated supply at 15 PSI (minimum)
- Water-cooled radiant heat source with 9 quartz (500W) infrared lamps
- Two gas burners with flame detection auto ignition
- Mass flow controller for precise gas control
- Water-cooled protective shutter
- Pneumatic sample carriage and shutter assembly
- Integrated sensor cooling stand (air cooled)
- Emergency stop cuts gas flow, power to lamps and pneumatics
- Tinted tempered glass shield protects operator
- Software safety interlocks monitor water flow, carriage position, burner ignition

TPP Feature Highlights & Benefits

- Evaluates the potential for skin burns associated with a fabric's ability to block convective and radiant heat penetration
- Automatic test operation provides repeatable and precise results
- Independently controlled radiant heat source and convective heat source
- Supports up to three copper disk calorimeter sensor assemblies
- Integrated air-cooled sensor stand quickly prepares calorimeter sensor for next test
- Water-cooled shutter is pneumatically actuated for precise exposure control
- Automatically predicts time to second degree burn, with results shown as a real-time numerical and graphical display of sample performance compared to the Empirical Performance Curve
- Small and portable, the TPP test device fits in most standard fume hood

Base Products Include:

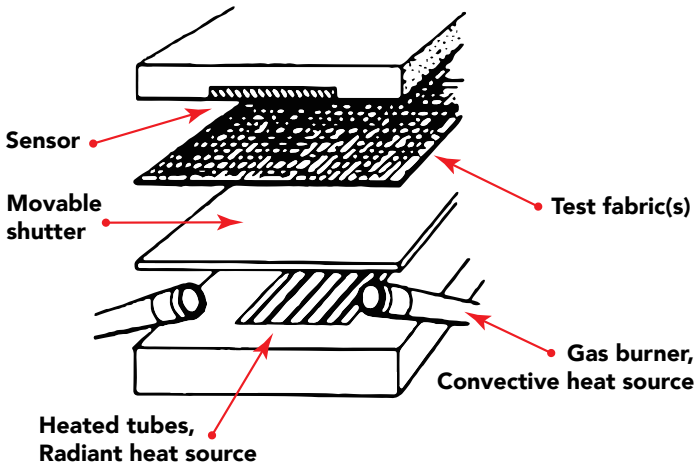
- TPP test device
- Laptop computer with ThermDAC control and Burn Model software
- Two removable sample holders
- Calibration assembly with HF Transducer
- Signal conditioning electronics and USB interface
- Calorimeter Sensors ordered separately, see table on next page
- Standard one-year warranty

THERMAL PROTECTIVE PERFORMANCE (TPP) TEST DEVICE

ThermDAC Control Software

ThermDAC is an engineered user interface for thermal manikin systems providing real-time device control, automated testing, and flexible display and logging capabilities, including:

- Zoomable time-history graph of multiple device and ambient variables
- Real-time statistical analysis over any user-selected time range
- Logging of raw data, statistical analysis, user-reports
- Device calibration and fault detection



403 - Protective Test System - Thermal Protective Performance (TPP)	Item #	Description	Product Name
Standard Base Product	**19-40301**	**Thermal Protective Performance (TPP)**	**403-XXX**
Standard Options	20-00619	Calorimeter Sensor Assy, ISO	—
	20-00621	Calorimeter Sensor Assy, ASTM	—
	20-00896	Sample Holder Stack-up, (ISO 2003)	—
	20-00898	Sample Holder Stack-Up, (ASTM)	—

Don't see what you need above? Contact Thermetrics to customize your perfect system.

Keep your TPP in tip-top shape. Discuss service plan options and point-of-sale discounts with us at sales@thermetrics.com.