Highlights

- Quick, reliable and accurate assessment of indoor and outdoor WBGT index
- Built-in radio technology for simultaneous, wireless monitoring in different locations/heights
- Rated IP54 to withstand harsh environmental conditions
- 8MB memory for extended data logging
- Battery Life: 400h (with radio on 20h)
- Automatic start/stop of measurements
- Probe design and performances according to ISO7726
- GIDAS TEA The most advanced software available on the market for Thermal Environment Analysis,.
- Support for ISO7730 thermal comfort analysis with PMV and PPD indexes, heat and cold stress Predicted Heat Strain (PHS), Insulation Required (IREQ).

Heat Shield includes globe temperature, wet bulb temperature the, dry bulb temperature and relative humidity and displays on-line WBGT indoor& outdoor index, Heat Index and Humidex. Thanks to its built-in radio technology, Heat Shield can support up to two satellite units to calculate WBGT at different levels (As per the recommendations outlined in ISO 7243: 1989) or in different locations. When equipped with the anemometer, the unit can be also used for accurate thermal environments analysis thanks to the most advanced software available on the market for this purpose, GIDAS TEA.

▶ Main Features

Measurements
All sensors are designed in compliance with ISO7726. Heat Shield supports both 15 cm (6") and 5 cm (2") black globes thermometers as well as external anemometers for air speed (va) measurement.

| Tg sensor, 5 cm (2") diameter | Tg sensor, 15 cm (6") diameter | Ta&RH% sensor | Tnw sensor | ESV125 Va sensor (hot wire) | DNA205 Va sensor (cups) |

Hot wire technology offers optimal performances indoors and in low air speed conditions, while a cup anemometer is ideal for outdoor use.

Calculations

Heat Shield calculates on-line and displays the following indexes:

- WBGT indoor&outdoor index (ISO7243). For up to 3 locations simultaneously it requires Satellite units.
- Head-Torso-Ankle Weighted Average WBGT (ISO7243) (requires Satellite units)
- Heat index According to 1990 National Weather Service (NWS) Technical Attachment (SR 90-23)
- Humidex According to J.M. Masterton and F.A. Richardson of Canada's Atmospheric Environment Service equation (1979)

Heat Shield has 8 Mb memory to store measurements and calculations performed during every survey. Once data are downloaded to a PC, LSI Lastem suggests two software applications: Using GIDAS TEA will be possible perform easy and quick creation of reports based on any available ISO index:

- PMV-PPD index, TO Operative Temperature index (ISO7730) (requires BSZ313 PC module)
- PHS Predicted Heat Strain (ISO7933) (requires BSZ317 PC module)
- IREQ Insulation Required, Duration Limit of the exposition (ISO11079) (requires BSZ313 PC module)

Using HS Manager will be possible to perform analysis of the results of Heat Shield and to evaluate working limits. HS Manager always comes together with Heat Shield units. GIDAS TEA is an optional program.
Read more about LSI Lastem programs in the last pages of this document.

Easy to operate

Heat Shield is very stable when placed on any horizontal surface but it can be also hand able or mounted on standard photographic tripod. With its on-and-play philosophy, measurements can be displayed in just a few instants from power on. No configuration is required by PC. Rechargeable batteries assure up to 400 hrs of measurement (20 hrs when using wireless Satellites).

Three levels WBGT on the same vertical

WBGT in three positions of the same environment

Three WBGT with wireless satellite modules

Heat Shield can be supplied as a single base unit or with two additional wireless satellite modules. The satellite units are used to measure environmental conditions at three levels and calculate Head-Torso-Ankle Weighted Average WBGT as required by the ISO 7243. Alternatively, the satellite modules can be used in different locations, performing three simultaneous measurements saving the user precious working time. Heat Shield radio can cover up to 300 m (line-of-sight; actual range in indoors conditions may vary).

Rugged and reliable

Heat Shield is extremely compact and robust. It has been designed to withstand the harsh working environments where heat stress condition normally arise both in indoor and outdoor conditions. Due to its metal case, it is very well protected against mechanical shocks, dust and dew. IP54 protection guarantees performance in outdoors or in dusty and humid conditions.

● Sales Kit
Heat Shield - Portable wireless WBGT meter

◄ KIT 1: Base WBGT kit

Includes:
- Heat Shield base module
- 90÷230 Vac power charger
- PC serial cable
- USB adapter
- HS Manager software
- carrying case.

◄ KIT 2: WBGT+Thermal comfort kit

Includes:
- Heat Shield base module
- 90÷230 Vac power charger
- PC serial cable
- USB adapter
- HS Manager software
- supports and carrying case.

Hot wire anemometer.

◄ KIT 3: Full three levels WBGT kit
Includes:
- Heat Shield base module plus n.2 satellite modules for 3-level measurements
- 90÷230 Vac power charger
- PC serial cable
- USB adapter
- HS Manager software
- carrying cases.

Code	Description	KIT 1	KIT 2	KIT 3
Heat Shield modules				
ELR610M	Heat Shield base module. Includes 110-220 Vac power charger, PC serial cable, USB adapter and HS Manager software. Small black globe sphere (5 cm diameter)	●	●	
ELR615M	Heat Shield base module. Includes 110-220 Vac power charger, PC serial cable, USB adapter and HS Manager software. Large black globe sphere (15 cm diameter)	Note 1	Note 1	Note 1
ELR610S	Heat Shield satellite module. Small black globe sphere (5 cm diameter)			● qt.2
ELR615S	Heat Shield satellite module. Large black globe sphere (15 cm diameter)	Note 1	Note 1	Note 1
Tripod				
BVA304	Tripod	Opt.	Opt.	●
BWA048	Soft bag for tripod and supports	Opt.	Opt.	●
BVA325	Support for Heat Shield and ESV125 anemometer on tripods or surfaces	Opt.	●	●
BVA326	Tripod extension for 3-level measurements and/or BVA308 mounting		Note 4	●
BVA308	H.80 cm pole for DNA205 anemometer on tripod		Opt.	Opt.
Anemometers				
ESV125	Hot wire anemometer	Opt.	●	Opt.
DNA205	Cup anemometer	Opt.	Note 4	Opt.
GIDAS TEA modules		Note 5	Note 5	Note 5
BSZ317	TEA module for hot environments. PHS index calculation. Calculator		Opt.	
BSZ313	TEA module for comfort environments. PMV-PPD index calculation. Calculator		Opt.	
BSZ315	TEA module for cold environments. ITR index calculation. Calculator		Opt.	●
Carrying cases				
BWA317	Carrying case for n.1 ELR610M and n.2 ELR610S modules plus accessories	●	●	●
BWA318	Carrying case for n.1 ELR615M and n.2 ELR615S modules plus accessories	Note 6	Note 6	Note 6

Note 1   Check your country policy and legislation to select the appropriate globe diameter.

Note 2   Normally tripod can use useful for three levels WBGT measurement

Note 3   Anemometer is required for calculation of PMV-PPD, PHS and IREQ. Hot wire technology (ESV125) offers optimal performances indoors and in low air speed conditions, while a cup anemometer (DNA205) is ideal for outdoor use.

Note 4   Wind measurement using DNA205 cup anemometer is required to evaluate the heat stress in outdoor conditions. In that case, DNA205 is mountable on a BVA304 tripod using BVA308 pole

Note 5   GIDAS TEA modules performs in-depth index calculation, data analysis and reporting. Each module includes also a unique "Calculator" feature, to perform sensitivity analysis simulating thermal environments conditions using real measurements or virtual data. See technical specification in the last pages of this document.

Note 6   Select a bigger carrying case when large black globe sphere (15 cm diameter) Heat Shield modules are selected.

Heat Shield base module

Heat Shield includes globe temperature, wet bulb temperature the, dry bulb temperature and relative humidity and displays on-line WBGT indoor& outdoor index, Heat Index and Humidex. Two models are available, one (ELR610M) with 2" (5 cm) sphere globe temperature sensor the other (ELR615M) with 6" (15 cm) sphere.

ELR610M (1) – ELR615M (2)	Type	Element	Range	Accuracy (0÷60°C)
	Natural Wet Bulb Thermometer (Cotton wick immersed into a built-in reservoir with detachable cover)	1/3 DIN-A Pt100	-20÷60°C	± 0.3°C
	Globe Thermometer **ELR610M**: 2" sphere **ELR615M**: 6" sphere	1/3 DIN-A Pt100	-20÷60°C	± 0.3°C
	Dry Bulb Thermometer (Equipped with radiant screen)	1/2 Pt100	-20÷60°C	± 0.8°C ±0.4 °C (10-40°C)
	Relative Humidity Sensor	Capacitive sensing element	0÷100%	1.8 %RH (10-90%)
	ESV125 Air Flow (optional)*	Hot wire (Tungsten wire diam. 9,45 µm)	0.01÷20 m/s	±10 cm/s (0,5÷1,5 m/s) 4% (>1,5 m/s)
	DNA205 Anemometer (optional)* *not supported on satellite units	Cup anemometer for outdoor use	0÷75 m/s	2,5%\

Common features

Calculated parameters	WBGT (indoor) index WBGT (outdoor) index	According to ISO7243 For up to 3 locations simultaneously (Requires Satellite units)
	Head-Torso-Ankle Weighted Average WBGT	According to ISO7243 (Requires Satellite units)
	Heat index	According to 1990 National Weather Service (NWS) Technical Attachment (SR 90-23)
	Humidex	According to J.M. Masterton and F.A. Richardson of Canada's Atmospheric Environment Service equation (1979)
	PMV-PPD**	According to ISO7730
	Predicted Heat Strain (PHS)**	According to ISO7933
	Insulation Required (IREQ), Duration Limit of the exposition (Dlim)**	According to ISO11079
	**Requires Air Flow measurement	** via post-processing Software
Data management	Data logging	10" sec÷12hrs; va=1"
	Memory	8MB of flash data memory
	Survey identification	Time and date stamping with clock and calendar
	Software compatibility	HS Manager (included), Gidas TEA (optional)
	Languages	English, Spanish, Portuguese, Italian

Power supply	Power supply	Stand-by: 0.2 mA (n.9 months)
	Power consumption (Radio ON)	TX ON: 180 mA, RX ON: 30 mA8 ÷ 14 Vdc
	Power consumption (Stand-by)	According to 1990 National Weather Service (NWS) Technical Attachment (SR 90-23)
Battery	Type	2 A (4.2 V) Lithium rechargeable
	Recharging time	~ 8 hrs
	Battery life	Standby: 9 months Radio OFF (without satellites): 400 hrs Radio ON (without satellites): 20 hrs
Other features	Internal clock	Accuracy: 30 sec/month (T=25°C)
	Display	LCD 4 x 20 car
	Keyboard	N.8 keys
	Processor	1 RISC 8 bit, clock 16 MHz
	ADC resolution	16 bit
	Sampling time	80 ms (rejection 50 Hz)
	Environmental limits	-20 ÷ 60 °C
	Protection	IP 54
	Standards / Approvals	CE Mark
	Weight	1,4 Kg
	Dimensions	185x220x55 mm
	Mounting	Threaded bushing allows mounting to standard photographic tripods

Interfaces		On instrument	External
	RS232 PC Interface (Base unit only)	Waterproof jack	Supplied with USB converter for PC connection
	12VDC power jack	Waterproof jack	AC adapter wall power cube (90÷230VAC – 50÷60Hz)
	Anemometer	Waterproof jack	Compatible with ESV125 Hot wire and DNA205 Cup anemometer

Heat Shield satellite module

Additional satellite module for ELR610M or ELR615M base modules. Each base module can manage up to two satellites. Two satellite models are available, one (ELR610S) with 2" (5 cm) sphere globe temperature sensor the other (ELR615S) with 6" (15 cm) sphere.

ELR610S (1) – ELR615S (2)	Type	Element	Range	Accuracy (0÷60°C)
	Natural Wet Bulb Thermometer (Cotton wick immersed into a built-in reservoir with detachable cover)	1/3 DIN-A Pt100	-20÷60°C	± 0.3°C
	Globe Thermometer **ELR610S:** 2" sphere **ELR615S:** 6" sphere	1/3 DIN-A Pt100	-20÷60°C	± 0.3°C
	Dry Bulb Thermometer (Equipped with radiant screen)	1/2 Pt100	-20÷60°C	± 0.8°C ±0.4 °C (10-40°C)
	Relative Humidity Sensor	Capacitive sensing element	0÷100%	1.8 %RH (10-90%)

Common features

Power supply	Power supply	8÷14 Vdc
	Power consumption (Radio ON)	TX ON: 180 mA, RX ON: 30 mA
	Power consumption (Stand-by)	Stand-by: 0.2 mA (n.9 months)
Battery	Type	2 A (4.2 V) Lithium rechargeable
	Recharging time	~ 8 hrs
	Battery life	20 hrs
Radio	Type	ZigBee
	Frequency	ISM 2.4 GHz direct sequence channels
	Power	10 mW (+10 dBm)
Other features	Internal clock	Accuracy: 30 sec/month (T=25°C)
	Keyboard	n.4 keys
	Processor	1 RISC 8 bit, clock 16 MHz
	ADC resolution	16 bit
	Sampling time	80 ms (rejection 50 Hz)
	Environmental limits	-20 ÷ 60 °C
	Protection	IP 54
	Standards / Approvals	CE Mark
	Weight	1,05 Kg
	Dimensions	185x150x55 mm
	Mounting	Threaded bushing allows mounting to standard photographic tripods

Interfaces

		On instrument	External
	12VDC power jack	Waterproof jack	AC adapter wall power cube (90÷230 VAC – 50÷60Hz)

LSI LASTEM GIDAS TEA (Thermal Environment Application) is a state-of-the-art software suite designed for the most comprehensive thermal analysis available on the market. With the 3 specific modules of TEA (Moderate/Hot/Cold environment) you can easily carry out ISO index calculations, generate thermal-comfort projects and reports, perform simulations and organize records and results in the database.

● GIDAS - TEA (Thermal Environments Applications)

Three modules are available for thermal index calculation, in full compliance with re-levant ISO

BSZ313: Thermal comfort indexes.

Determination and interpretation of thermal comfort using calculations and local thermal comfort criteria for optimal comfort conditions according to the following ISO indexes:
- PMV Predicted mean vote (ISO7730)
- PPD Predicted % of dissatisfied (ISO7730)
- DR Predicted % of dissatisfied by draught (ISO7730)
- TO Operative temperature (ISO7730)

BSZ315: Cold environments

Determination and interpretation of cold stress when using required clothing insulation and local cooling effects to limit the possible decrease of body temperature according to physical thermoregulation activity.
- ITR required thermal insulation (ISO 11079)

BSZ317: Heat stress

Analytical determination and interpretation of heat stress using calculation of the predicted heat strain to avoid dangerous conditions for the health of hot environment workers.
- WBGT Wet bulb globe temperature. Inside/outside (ISO 7243)
- PHS Predicted heat strain (ISO7933:2004)
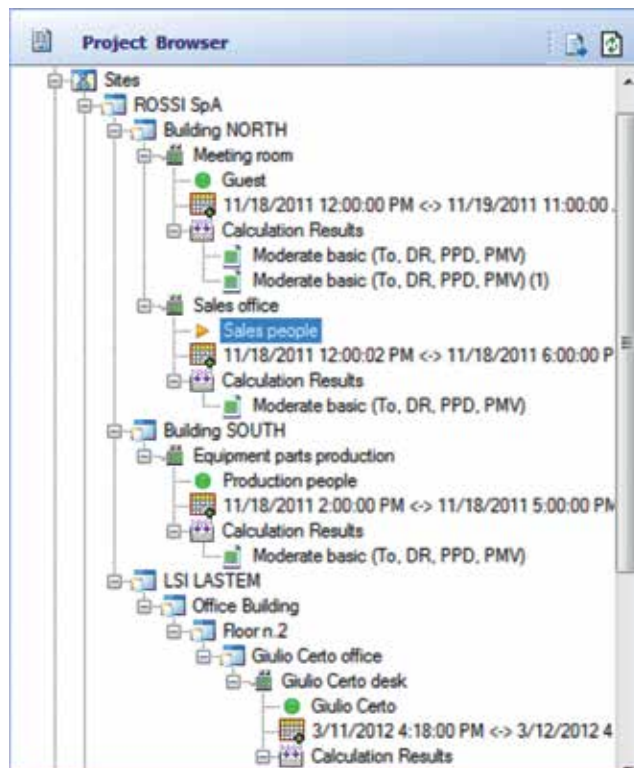
Environments setup

■ Organize each measurement location with record information. (Name, place, description, etc.). One or more subjects can be assigned to every measurement location.
■ Index calculation for every measurement location and every subject.

◀ interface - **project browser**
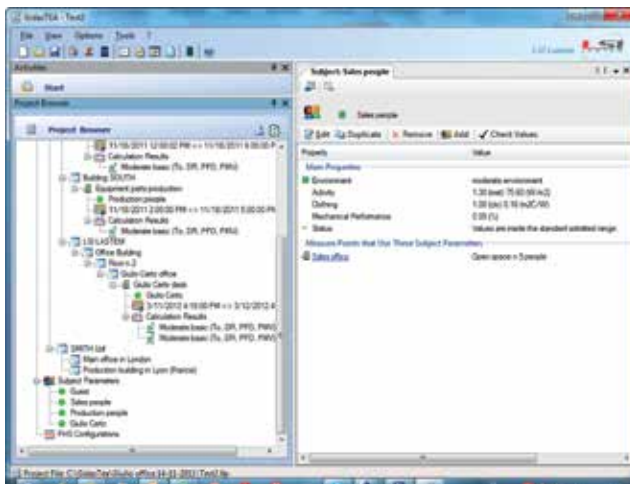
General
- Data download from M/R-Log
- Measurement locations setup
- Subject parameters (clothing and activity) setup
- Measurement reports, tables and charts.
- Index calculation and in-depth analysis using different subject parameters (sensing analysis)
- Quick index calculator

○ interface - **Gidas TEA**
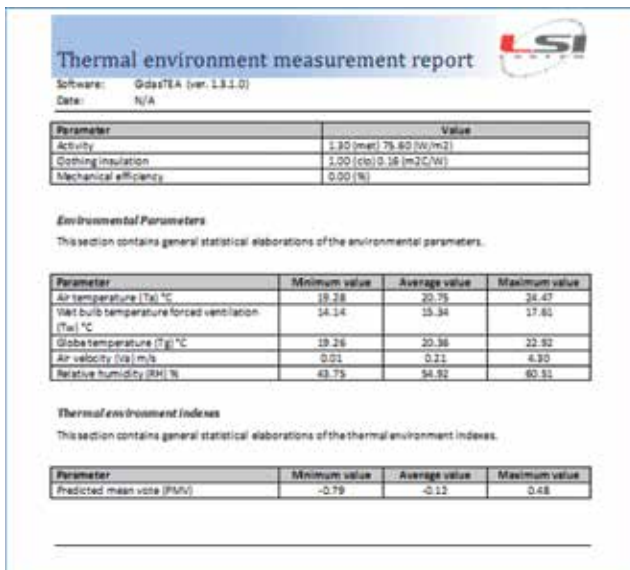
Final report
- Tables an charts for measured quantities and thermal enviroment indexes.
- Final report, with complete information (measurements positions, subjects, environmental quantities and thermal environment indexes, in charts and summarized tables, with editable records).
- DocX, open office, xml (ECMA-376) document format.

○ interface - **measurement report**
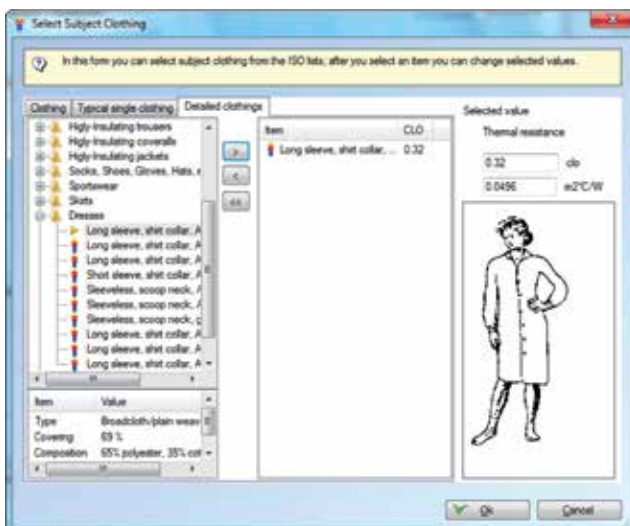
Subject setup
Values setup using tables and pictures from ISO standards, including:

- Subject activity (MET)
- Clothing (Clo)
- Rendiment (ETA)

○ interface - **select subject clothing**

Calculator feature

■ Manual entering of Subject parameters (Clo, MET, ETA) and environmental quantities (temperature, RH%, air speed, etc.).
■ Sensing analysis of thermal indexes when editing the entered quantities.
■ Reports in DocX, Open Office xml (ECMA-376) formats.

● HS Manager

HS Manager is a PC module to download and manage data (index and measurements) coming from the Heat Shield Base module. HS Manager is included with the ELR610M-S and ELR615M-S modules.
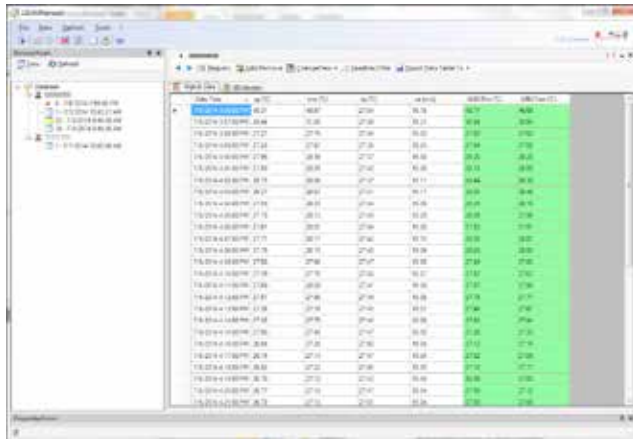
Main

■ Data downloading
■ Data storing for each survey number
■ Row data (index and measurements) reports in table and charts
■ Requery of the row data into Max/Min/Ave/Standard Deviation values over a programmable time base
■ Data export to Excel
■ Charts and tables copy&paste feature
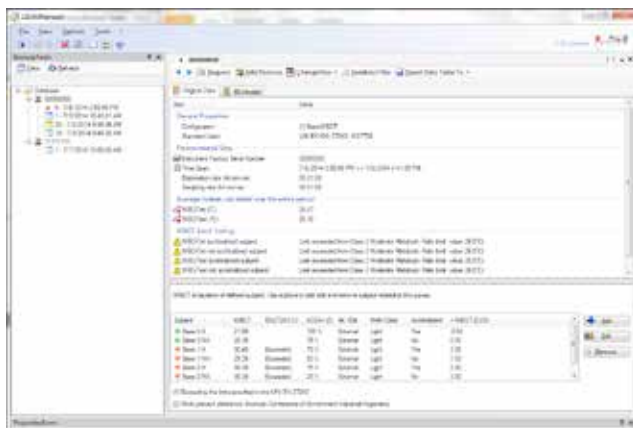
WBGT management

■ WBGT average calculation over the entire survey
■ Highlight of the worst hour
■ WBGT limits evaluations for UNI 27243 and for ACGIH
■ WBGT limits of exposure for MET classes, YES/NOT acclimatized persons and Clothing levels

Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.

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