GidasTEA

(Gidas Thermal Environment Application)

User's manual

Update 11/11/2024

Cod. **SWUM_00662_en**

Summary

1. Introduction

GidasTEA is the LSI LASTEM program for the calculation of the most common and known thermal indices regulated by International law (ISO).

The program allows:

- Calculation of thermal standards in accordance with the International standards requirements.
- Creation and management of complicated projects for analysis with several measuring points and different kinds of calculations;
- An easy definition of subject parameters;
- To select the environmental data from LSI LASTEM *Gidas* database;
- The creation of presentation documents in *Office Open XML* (*ECMA-376*) format, compatible with *Microsoft Office* and *OpenOffice*;

1.1. Main changes introduced with version 1.9.0

- The PHS calculation has been updated based on the provisions of the 2023 version of the UNI ISO 7933 "*Ergonomics of the thermal environment - Analytical determination and interpretation of heat stress using calculation of the predicted heat strain".*

- The calculation of the radiant temperature has been updated following the formulas present in UNI ISO 7726 and UNI ISO 7243 valid for both type C (comfort) and type S (stress) environments.

- When entering metabolic activity, the table based on activities and relating to level 1 foreseen by the 2022 version of the UNI ISO 8996 standard has also been added.

- The function to create a library of subject parameters for use in various projects has been added. This function is useful if you use the same standard subjects in different projects because it allows you to avoid inserting the same subject in every project.

2. System requirements

Personal computer

- Processor at 600 MHz operating frequency or higher. 1 GHz recommended;
- Display: SVGA res. 1024x768 or higher;
- Operating system (*) from Microsoft Windows 7
- Microsoft .NET Framework V.3.5 (**);
- LSI LASTEM 3DOM program (updated to the last available version) previously installed to communicate with the instrument;
- LSI LASTEM *Gidas* Database for data recording (***).

(*) Operating systems must be updated with the latest update released by Microsoft and available through Windows Update; for operating systems not listed is not guaranteed correct and complete operation of programs.
(**) On Windows 8 or superior you can enable. NET Framework 3.5 manually from the Control Panel. In the Control Panel you can use Add Programs and Features, then Enable or disable Windows features and then select the check box Microsoft. NET Framework 3.5.1. This option requires an Internet connection.
(*) *Gidas* database is installed with *GidasViewer* program and required *SQL Server 2005 Express* or higher. *GidasTEA* can also be connected to *Gidas* database installed on SQL Server remote instance. For the system requirements of *SQL Server Express*, see the documentation of the *GidasViewer* program or the official Microsoft site http://technet.microsoft.com/en-us/library/ms143506(SQL.90).aspx

3. Reference standards and calculations

3.1. Moderate thermal environments

The reference standard for the calculations of moderate thermal environments is the ***UNI EN ISO 7730*** "*Ergonomics of the thermal environments - Analytical Determination and interpretation of thermal comfort using calculations of PMV and PPD indices and local thermal comfort criteria*".
The standard "… presents methods for predicting the general thermal sensation and degree of discomfort (thermal dissatisfaction) of people exposed to moderate thermal environments. It enables the analytical determination and interpretation of thermal comfort using calculation of PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices and local thermal comfort criteria".

3.1.1. Calculations

The *Moderate Thermal Environments* module allows the following calculations:

- Moderate base (to, DR, PPD, PMV indices);
- Moderate ceiling radiant asymmetry (PDwc, PDcc indices);
- Moderate wall radiant asymmetry (PDcw, PDww indices);
- Moderate thermal dissatisfaction (PDv, PDf indices).

3.1.1.1. Moderate base

The following table reports a list of the calculated indices and of the variables used and the indication of validity limits set by the standard:

UNI EN ISO 7730 standard			
Abbr.	*Description*	*Limit default*	*Value*
PMV	Predicted mean vote	-3 ÷ 3%	Calculated
PPD	Predicted percentage of dissatisfied	0 ÷ 100 %	Calculated
DR	Draught rate	0 ÷ 100 %	Calculated
to	Operative temperature	10 ÷ 30 °C	Calculated
CLO	Clothing insulation	0 ÷ 2 clo	Set
ETA	Mechanical efficiency	0 ÷ 25 %	Set

MET	Activity	0,8 ÷ 4 met	Set
ta	Air temperature	10 ÷ 30 °C	Acquired
tw	Wet bulb temperature forced ventilation	-10 ÷ 30 °C	Acquired
tg	Globe temperature	10 ÷ 40 °C	Acquired
va	Air velocity	0 ÷ 1 m/s	Acquired
Pa	Partial water vapour pressure in the air	0 ÷ 2,7 kPa	Calculated
RH	Relative humidity	0 ÷ 100 %	Calculated /Acquired (*)
tr	Mean radiant temperature	10 ÷ 40 °C	Calculated
var	Air relative velocity	0 ÷ 1 m/s	Calculated

* "Calculated" using a psychrometric sensor forced ventilation with dry and wet bulb.
"Acquired" directly by a relative humidity sensor.

The moderate base environmental calculation displays also the value of the thermal environment category.

3.1.1.2. Moderate radiant asymmetry

The following table reports a list of the calculated indices and of the variables used and the indication of validity limits set by the standard:

UNI EN ISO 7730 standard			
Abbr.	*Description*	*Limit default*	*Value*
PDwc	Percentage dissatisfied (rad. asymmetry, warm ceiling)	0 ÷ 100 %	Calculated
PDcw	Percentage dissatisfied (rad. asymmetry, cool wall)	0 ÷ 100 %	Calculated
PDcc	Percentage dissatisfied (rad. asymmetry, cool ceiling)	0 ÷ 100 %	Calculated
PDww	Percentage dissatisfied (rad. asymmetry, warm wall)	0 ÷ 100 %	Calculated
ΔTpr,wc	Warm ceiling radiant asymmetry	1 ÷ 15 °C [gr] 0 ÷ 14 °C [eq]	Acquired
ΔTpr,cc	Cold ceiling radiant asymmetry	6 ÷ 20 °C [gr] 0 ÷ 14 °C [eq]	Acquired
ΔTpr,ww	Warm wall radiant asymmetry	6 ÷ 35 °C [gr] 0 ÷ 35 °C [eq]	Acquired
ΔTpr,cw	Cold wall radiant asymmetry	6 ÷ 20 °C [gr] 0 ÷ 15 °C [eq]	Acquired

The calculations of radiating asymmetries are implemented with two different methods:

- [gr]: the calculation is done as polynomial interpolation of Fanger graphs;
- [eq]: the calculation is done used those formulas introduced by ISO.

The calculations do not require the definition of subject parameters.

3.1.1.3. Moderate temperature dissatisfied

The following table reports a list of the calculated indices and of the variables used and the indication of validity limits set by the standard:

UNI EN ISO 7730 standard			
Abbr.	*Description*	*Limit default*	*Value*
PDv	Percentage dissatisfied (vert. air temp. diff.)	0 ÷ 100 %	Calculated
PDf	Percentage dissatisfied (floor temp.)	0 ÷ 100 %	Calculated
DTv	Vertical air temperature difference	0 ÷ 6 °C	Calculated

Ta	Air temperature	10 ÷ 30 °C	Acquired
Ta10	Air temperature 10 cm	10 ÷ 30 °C	Acquired
Tf	Floor temperature	5 ÷ 40 °C	Acquired

The calculations do not require the definition of subject parameters.

3.2. Hot thermal environments

GidasTEA implements the following standards for the calculation of severe hot environments:

- PHS calculation: UNI EN ISO 7933-2023: " Ergonomics of thermal environment - Analytical determination and interpretation of thermal stress caused by heat with the calculation of Predicted Heat Strain model (PHS)".
- WBGT index calculation: UNI EN ISO 7243-2017 "Ergonomics of the thermal environment - Assessment of heat stress using the WBGT (wet bulb globe temperature) index"

3.2.1. PHS Predicted Heat Stream Model (UNI EN ISO 7933-2023)

The calculation described in the standard evaluates the evolution of two parameters, rectal temperature and the total loss of liquids, minute by minute in each site where the subject operates. That is why you need to follow the worker during his activity, including the resting times: the calculation will not be linked to a single measure point, but to an ordered sequence of measure points (including the measure points associated to resting locations) each one characterized by a set of subject parameters and a series of data describing, minute by minute, the environmental parameters flow.

The standard for calculating the PHS was updated in 2023 and *GidasTEA* version 1.9 implements the changes.

All PHS calculations made starting from version 1.9 of the program use the new formulation as defined in the 2023 version of the standard.

The program is able to automatically distinguish new calculations from calculations made with previous versions of the standard.

The main changes to the calculation of the PHS compared to the previous version of the standard are the following:

- The maximum sweat rate *SWmax* described in B.4 has been corrected, i.e. it is no longer adjusted for metabolic rate. New limits are:
    - Unacclimatized subject: 400 g/h
    - Acclimatized subject: 500 g/h
- In the criteria used to determine the maximum exposure time, the criterion based on 50% of workers was eliminated, maintaining only the criterion based on 95% of workers (B.1)

The calculation code implemented in *GidasTEA* was therefore updated by modifying the *SWmax* verification calculation and removing the calculation of time limits based on 50% of workers.

When analyzing the standard, two small inconsistencies were found between the formulas present in the text and those present in the calculation code attached to the standard.

Tcreqm equilibrium core tempreature (A.6)

- Computer program (Annex E);
  *Tcreqm = 0.0036 * M + 36.602;*

- A.8 formula:
  $t_{cr,eq} = 0{,}003\,6(M - 55) + 36{,}8$ (A.8)

fcl clothing area factor (A.7)

- Computer program (Annex E);
  *fcl = 1+0.28 *Icl;* (*Icl* in *CLO*)
  *fcl = 1+1.81 *Icl;* (*Icl* in m^2K/W)

- A.14 formula (*Icl* in m^2K/W):
  $f_{cl} = 1 + 1{,}97 \cdot I_{cl}$ (A.14)

In both cases the formulas present in the text of the standard were used.

Limit values for different stress and strain criteria

Below is a list of the limit values for different stress and strain criteria:

Stress Criteria	***Limit values***	
	Not Acclimatized Individual	*Acclimatized Individual*
Wmax	0,85	1,00
SWmax [g/h]	400	500

Strain Criteria	***Limit values***	
	Not Acclimatized Individual	*Acclimatized Individual*
Tremax [°C]	38	38
Strain Criteria	***Limit values***	
	Free liquids access	*Without liquids access*
Dmax95 [kg]	5% body mass	3% body mass

Where:

- Wmax = max. share of wet skin;
- SWmax = max. sweat level;
- Tremax = max. rectal temperature;
- Dmax95 = max. liquid loss related to 95% of working population.

Applicability of the standard limits

The limits of environmental quantities and individuals set by the reference standard:

UNI EN ISO 7933 standard	
Measure	*Applicability limits*
M•Adu	**56 ÷ 250 (W/m^2)**
Icl	**0,1 ÷ 1,0 clo (0 ÷ 0,155 m2°C/W)**
ta	**15 ÷ 50 °C**
tr – ta	**0 ÷ 60 °C**
va	**0 ÷ 3 m/s**
pa	**0,5 ÷ 4,5 kPa**

Where:

- M = metabolic rate [W/m2];
- Icl = static thermal insulation of clothing [clo];
- ta = air temperature [°C];
- tr = mean radiant temperature [°C];
- va = air velocity [m/s];
- pa = partial water vapour pressure in the air [kPa].

Note on verifying calculations

GidasTEA version 1.9 was verified on the data reported in Appendix F of the standard, and all results are within the expected tolerances. To replicate the tests you need:

- add 5 user-defined data sets with the values indicated in the table in Appendix F;
- add 5 subjects with the values indicated in the table in Appendix F (*);
- add 5 configurations for calculating the PHS, associating each with a subject and a data set;
- carry out a calculation for each configuration defining the residence time and the state of the subject (weight, height and state of acclimatization) with the values indicated in the table in Appendix F.

(*) When defining the metabolism of the subjects, keep in mind that in the tests required by the standard the metabolism is entered in *W* while the subjects used by *GidasTEA* use *met*.
Considering the characteristics of the subject used in the tests, weight 75 *kg* and height 1.8 *m* for a total body surface area of 1.94 m^2, it is necessary to enter the following values:

TEST	M(W)	M(W/m2) (*)	M(met) (**)
1	300	154,8090274	2,66
2	300	154,8090274	2,66
3	300	154,8090274	2,66
4	450	232,2135411	3,99
5	250	129,0075228	2,22

(*) Obtained by dividing the required *M(W)* value by the body surface area of the test subject.
(**) Obtained by converting the *W/m2* units into *met*.

3.2.2. WBGT index (ISO 7243:2017)

The following table reports a list of the calculated indices and of the variables used and the indication of validity limits set by the standard:

UNI EN ISO 7730 standard			
Abbr	*Description*	*Limits default*	*Value*
WBGText	Wet Bulb Globe Temperature (external environment)	0 ÷ 100 %	Calculated
WBGTint	Wet Bulb Globe Temperature (internal environment)	0 ÷ 100 %	Calculated
Ta	Air temperature	15 ÷ 50 °C	Acquired
Tnw	Wet bulb temperature natural ventilation	0 ÷ 60 °C	Acquired
Tg	Globe temperature	0 ÷ 80 °C	Acquired

The result of the calculation is the exceeding of the limits for a generic subject based on its metabolic class, as defined in table A.1 of the standard.

Although not requiring explicit definition of the parameters of the subject, it is possible to calculate the *WBGTeff*, included in the 2017 version of the standard, considering the corrective value of clothing (CAV) and evaluate the exceeding of the limits with the equations reported in the Annex A using the specific value of the metabolic activity of the subject.

3.2.2.1. WBGT index three levels (ISO 7243:1996)

The following table reports a list of the calculated indices and of the variables used and the indication of validity limits set by the standard:

UNI EN ISO 7730 standard			
Abbr	*Description*	*Limits default*	*Value*
WBGText	Wet Bulb Globe Temperature (external environment)	0 ÷ 100 %	Calculated
WBGTint	Wet Bulb Globe Temperature (internal environment)	0 ÷ 100 %	Calculated
Ta1	Air temperature (ankles)	15 ÷ 50 °C	Acquired
Tnw1	Wet bulb temperature natural ventilation (ankles)	0 ÷ 60 °C	Acquired
Tg1	Globe temperature (ankles)	0 ÷ 80 °C	Acquired
Ta	Air temperature (abdomen)	15 ÷ 50 °C	Acquired
Tnw	Wet bulb temperature natural ventilation (abdomen)	0 ÷ 60 °C	Acquired
Tg	Globe temperature (abdomen)	0 ÷ 80 °C	Acquired
Ta2	Air temperature (head)	15 ÷ 50 °C	Acquired
Tnw2	Wet bulb temperature natural ventilation (head)	0 ÷ 60 °C	Acquired
Tg2	Globe temperature (head)	0 ÷ 80 °C	Acquired

The calculation does not require the definition of subject parameters.
By convention, the variables indicated by the index 1 refer to values measured at ankle level of the subject, the variables without index refer to values calculated at abdomen level of the subject and the variables with subscript 2 refer to values calculated at head level of the subject.
The difference compared to the basic calculation is given by the fact that the indices are calculated from the following average (part 5.1 of the standard):

$$WBGT=(WBGT_{head} + (2 \times WBGT_{abdomen}) + WBGT_{ankles}) / 4$$

This calculation is no longer present in the 2017 version of the standard and is maintained in the program only for reasons of retro compatibility.

3.3. Cold Thermal environments

The reference standard for the calculation in cold thermal environments is ***UNI EN ISO 11079*** *"Ergonomics of thermal environment. Determination and interpretation of cold stress when using required clothing insulation (IREQ) and local cooling effects".*
This standard "… specifies method and strategies for assessing the thermal stress associated with exposure to cold environments."

3.3.1. Calculations

The *Cold Therma Environemntsl* module allows the following calculations:

- Cold stress base (indexes IREQ, IclReq, Dlim, TWC);
- Cold stress recovery time (Drec);

3.3.1.1. Cold stress base

The following table reports a list of the calculated indices and of the variables used and the indication of validity limits set by the standard:

UNI EN ISO 11079			
Abbr.	***Description***	***Limit default***	***Item***
IREQ	**Required insulation**	**0 ÷ 10 clo**	**Calculated**
IclReq	**Required clothing insulation**	**0 ÷ 10 clo**	**Calculated**
Iclr	**Real clothing insulation**	**0 ÷ 10 clo**	**Calculated**
Dlim	**Duration limited exposure**	**0 ÷ 480 minutes**	**Calculated**
TWC	**Wind Chill temperature**	**-80 ÷ 10 °C**	**Calculated**
TWCRisk	**Wind Chill temperature classification of risk**	**from 1 to 4**	**Calculated**
CLO	**Basic clothing insulation**	**0.1 ÷ 10 clo**	**Input data**
ETA	**Effective mechanical power**	**0 ÷ 30 %**	**Input data**
MET	**Metabolic rate**	**0,8 ÷ 10 met**	**Input data**
Im	**Moisture permeability index**	**0 ÷ 10**	**Input data**
EpsCl	**Emissivity of clothing surface**	**0 ÷ 1**	**Input data**
Vw	**Walking speed**	**0 ÷ 1.2 m/s**	**Input data**
ap	**Air permeability**	**0 ÷ 1000 l/(m2s)**	**Input data**
Ta	**Air temperature**	**-80 ÷ 10 °C**	**Acquired**
tw	**Wet bulb temperature forced ventilation**	**-80 ÷ 30 °C**	**Acquired**
tg	**Globe temperature**	**-80 ÷ 30 °C**	**Acquired**
va	**Air velocity**	**0.4 ÷ 18 m/s**	**Acquired**
Pa	**Water vapor partial pressure**	**0 ÷ 2,7 kPa**	**Calculated**
RH	**Relative humidity**	**0 ÷ 100 %**	**Calculated / Acquired**
tr	**mean radiant temperature**	**-80 ÷ 30 °C**	**Calculated**

NOTE:

- IREQ, IclReq and Dlim are calculated at the following two levels of physiological strain: minimal thermal insulation, representing some body cooling, and neutral thermal insulation, that keeps normal level of mean body temperature.
- VDE is an index is an index that can assume the following values:
  - 1 = Basic clothing insulation less than minimal required basic clothing insulation; program shows limited exposure duration in minimal conditions;
  - 2 = Basic clothing insulation greater than minimal required basic clothing insulation and less than neutral required basic clothing insulation: program shows limited exposure duration in neutral conditions;
  - 3 = Basic clothing insulation greater than neutral required basic clothing insulation; warm, overheating clothing insulation shall be reduced: program does not show any limited exposure duration.
- To calculate the index TWC, the standard requires that wind speed measurement at 10 m; if the local wind velocity at ground level is measured, it must be multiplied by 1.5 before it is used to calculate TWC index. The program uses this factor to change the va variable in the TWC calculation.
- The wind chill temperature classification of risk is based on D.2 table of the standard.
- The RH variable is "Calculated" using a psychrometric sensor forced ventilation with dry and wet bulb or "Acquired" directly by a relative humidity sensor.
- in case of intermittent exposures it is necessary to evaluate the more severe exposure situation and the less severe, by calculating the required thermal insulation of clothing in both cases. The clothing to be used to deal with the variability of exposure conditions must be changed within the range of values calculated adding or removing clothing. The clothing you choose must be easy to wear and take off.

3.3.1.2. Cold stress recovery time

The following table reports a list of the calculated indices and of the variables used and the indication of validity limits set by the standard:

UNI EN ISO 11079			
Abbr.	*Description*	*Limit default*	*Item*
Drec	Recovery time	0 ÷ 480 minutes	Calculated
CLO	Basic clothing insulation	0.1 ÷ 10 clo	Input data
ETA	Effective mechanical power	0 ÷ 30 %	Input data
MET	Metabolic rate	0,8 ÷ 10 met	Input data
Im	Moisture permeability index	0 ÷ 10	Input data
EpsCl	Emissivity of clothing surface	0 ÷ 1	Input data
Vw	Walking speed	0 ÷ 1.2 m/s	Input data
ap	Air permeability	0 ÷ 1000 l/(m2s)	Input data
Ta	Air temperature	-80 ÷ 10 °C	Acquired
tw	Wet bulb temperature forced ventilation	-80 ÷ 30 °C	Acquired
tg	Globe temperature	-80 ÷ 30 °C	Acquired
va	Air velocity	0.4 ÷ 18 m/s	Acquired
Pa	Water vapor partial pressure	0 ÷ 2,7 kPa	Calculated
RH	Relative humidity	0 ÷ 100 %	Calculated / Acquired
tr	mean radiant temperature	-80 ÷ 30 °C	Calculated

NOTE:

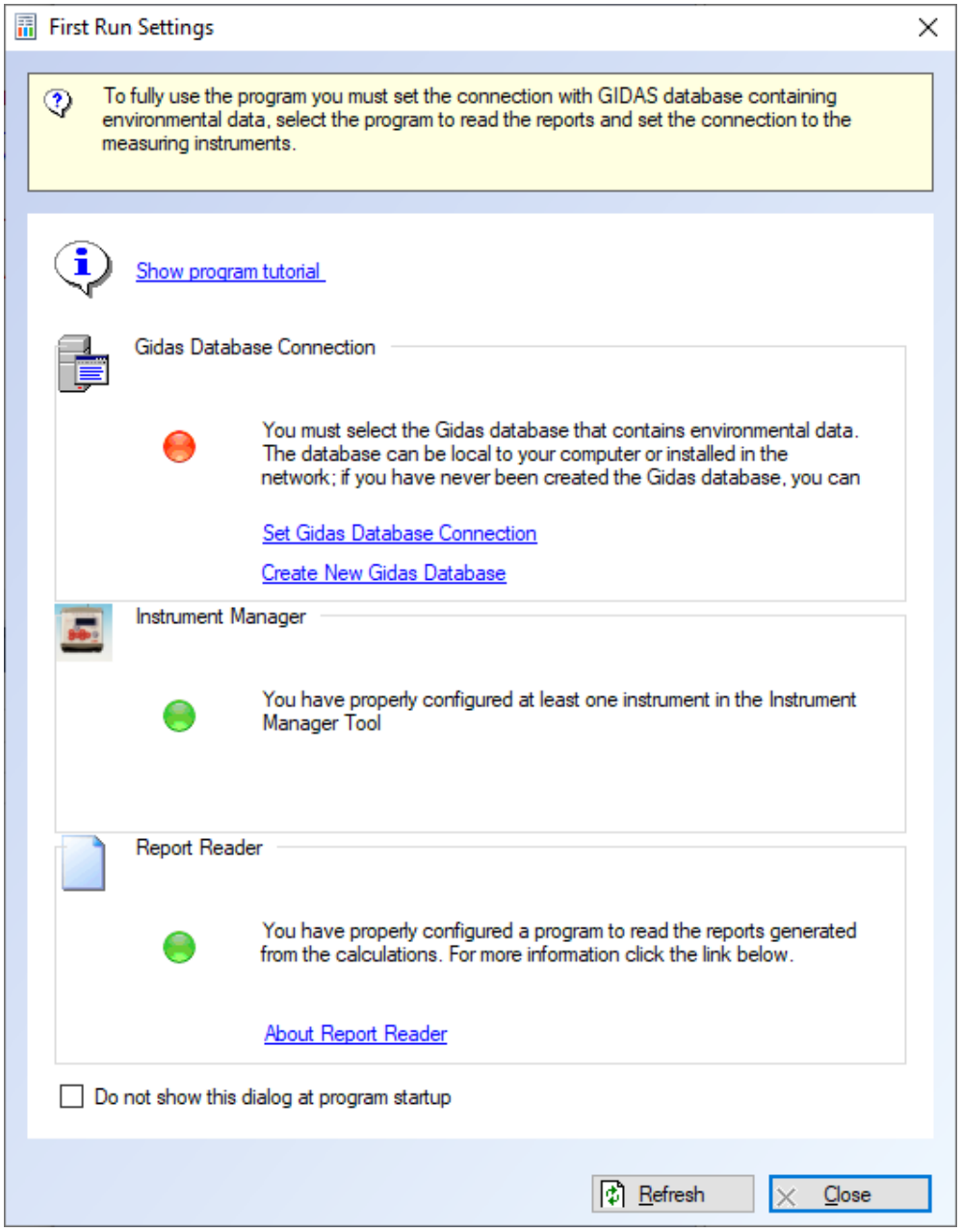
- The limits refer to a general recovery environment.

4. Preliminary configurations

When starting the program for the first time it might be necessary to perform the following operations:

- Select *Gidas* database containing the environmental data: the program can use both a local and a network database. If a *Gidas* database has not been created before it is possible to create a new *Gidas* database in the local computer (§4.1). If *Gidas* database has been created during the installation procedure, this operation will not be needed.
- Add your instrument to instruments manager (§4.2).
- Set the program for the visualization of the relations generated by the calculations (§4.3).

This window appears each time you start the program when the configuration operations have not been completed or if the user has not selected the option "Do not show this dialog at program startup".



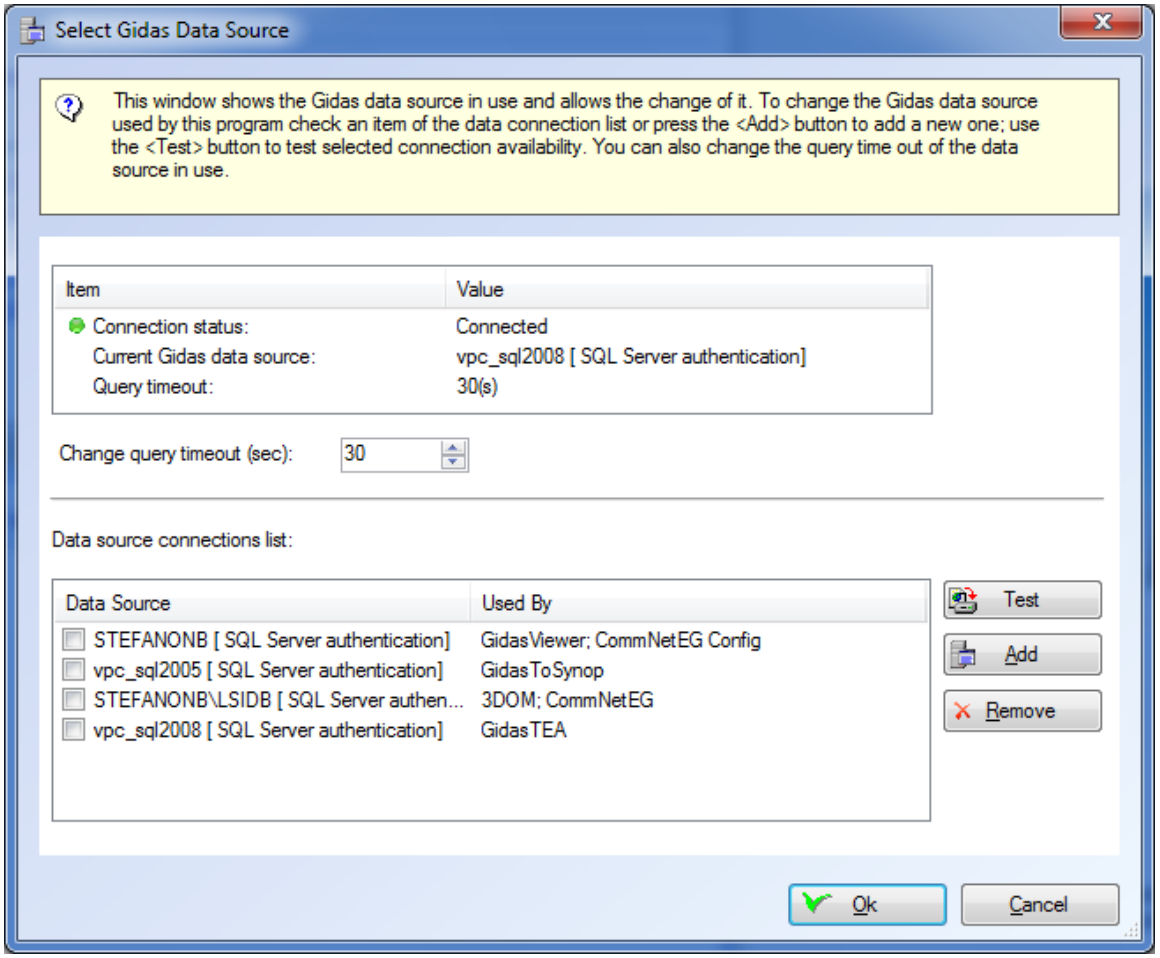
We suggest selecting the link *Show program tutorial* to start the program.

4.1. Gidas database configuration

GidasTEA program uses the environmental data recorded on Gidas database, the SQL Server database used to record the data measured by LSI LASTEM instruments.
In order to store data on Gidas database you have first to install the *GidasViewer* creating the database itself and to request a login license for each datalogger. This action requires the presence of SQL Server from 2005 version: if the user does not have this application, during the database installation a free of charge version of SQL Server *Express* will be installed. For further information please see the manual of *GidasViewer* program.

4.1.1. Connecting to Gidas database

Once launched for the first time *GidasTEA* program automatically logs in *Gidas* database created with the installing procedure of *GidasViewer* program. The program can also log in a *Gidas* database set on a different device accessible by network; in this case please use the menu *File* → *Change Data Source* which opens the window for the selection of data source:



This window shows the *Gidas data source* in use and allows the change of it. To modify the data source used by the program select one element from the list of available data sources or press the <*Add*> button to add a new one; use the <*Test*> button to test the selected connection availability. It will be mainly available the connection to local computer. For further info pleas consult the manual of *GidasViewer* program.

The current version of *GidasTEA* program is compatible with *Gidas* database 2.4.0.0. version or higher; to visualize the connected database version select the menu *?→About Gidas database*.

If the user has two different installations on *Gidas* database (e.g. a local and a network one), he can modify the data sources used by the program using *File → Change Data Source.* This operation will close the running calculation project.

4.1.2. Creating the Gidas database

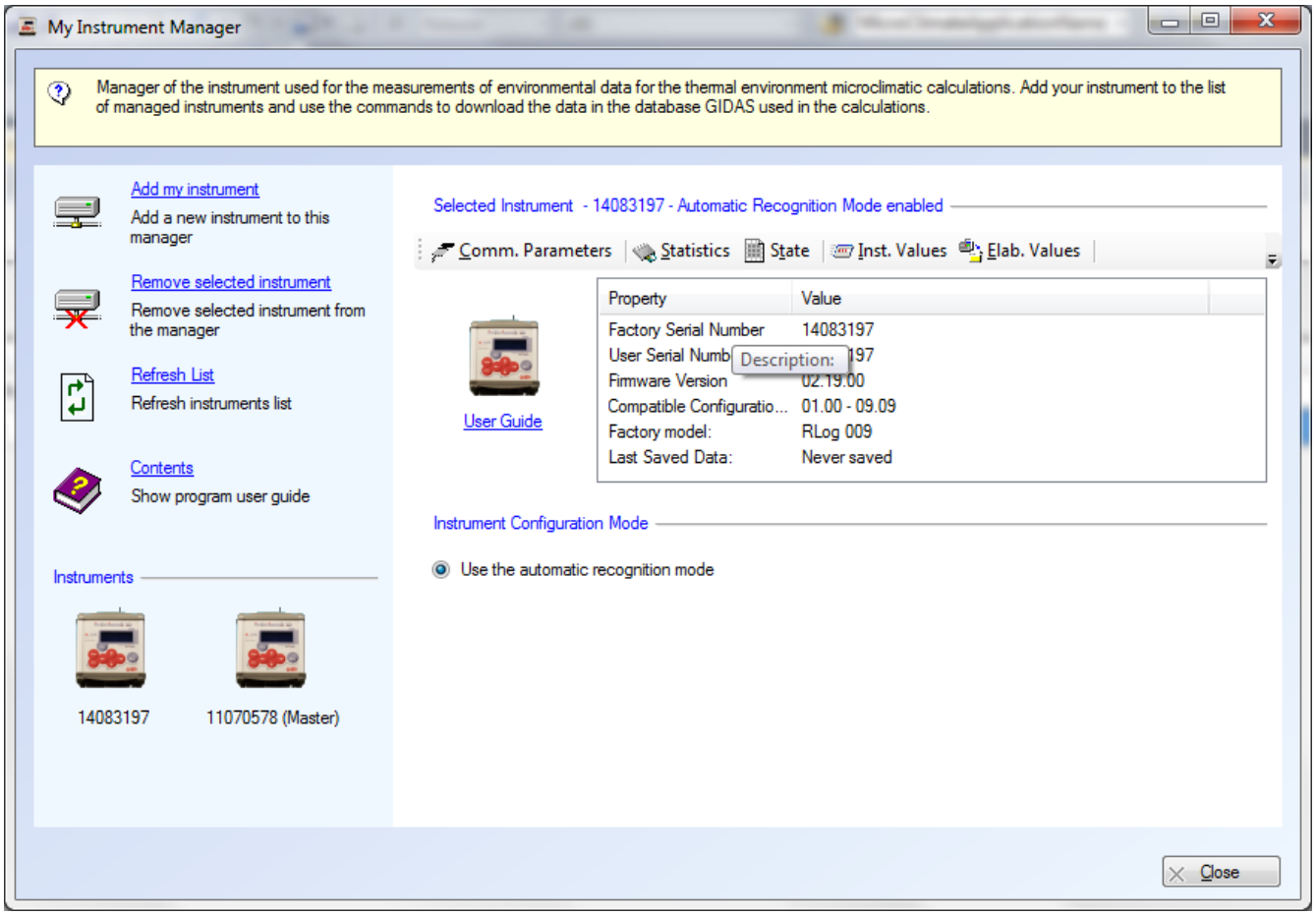
If there is no *Gidas* database available, you must close *GidasTEA* and start the *GidasViewer* program that allows its creation. If *GidasViewer* is installed on the same computer, it is automatically started after closing *GidasTEA*.

4.2. Instrument and measured data configuration

For thermal calculations you need to perform a valid measurements with an LSI Lastem datalogger and to store the data on *Gidas* database. *GidasTEA* application is optimized for the use of LSI LASTEM M/*R-Log* instruments using the automatic recognition mode.

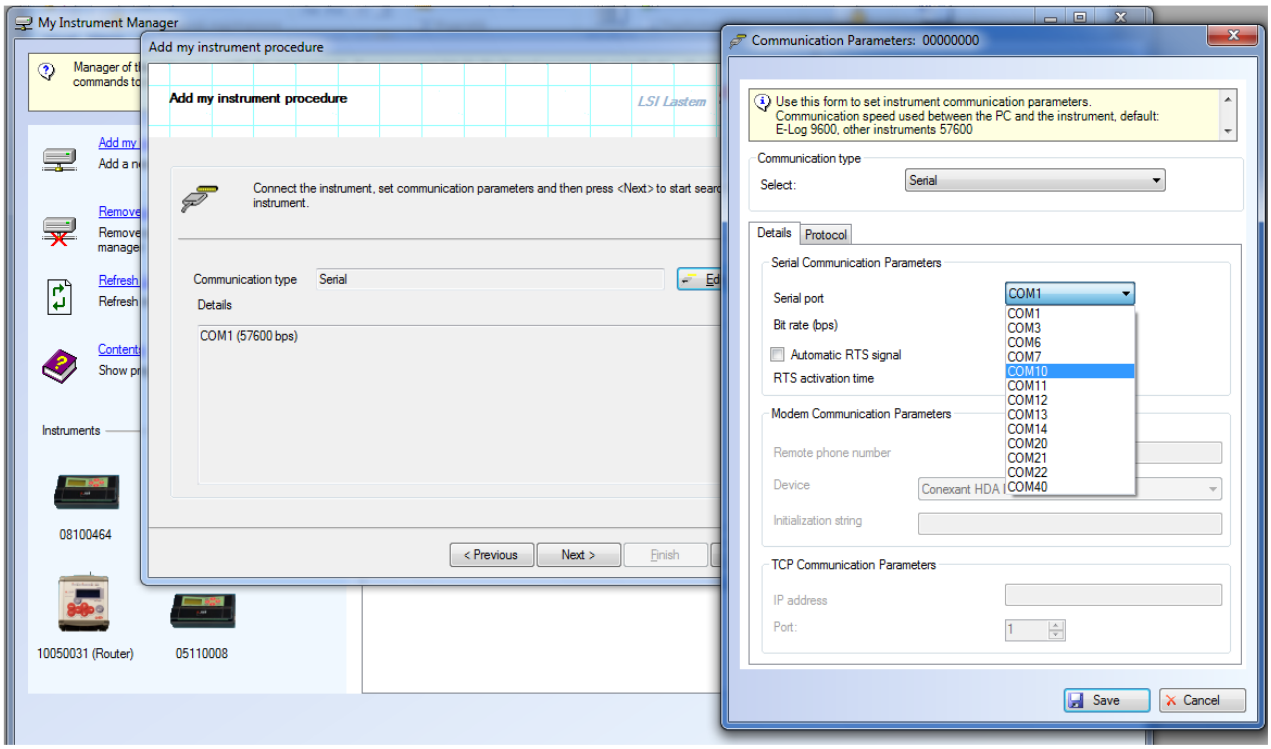
WARNING
If you use data recorded by an HeatShield datalogger with the program HSManager it is NOT required to configure the datalogger in the Instrument Manager and you can skip this part of the manual.

To open the *Instrument Manager* window, select the menu *Instruments → Instrument Manager* or chose the  icon on the instrument bar.



Instrument Manager is a short version of *3DOM* program, where the basic management operations of your instrument are particularly facilitated.

In order to manage your own instrument you need to add it to the instrument list, by selecting the *Add My Instrument* command. It is possible to add an instrument previously configured with *3DOM* or never configured before connecting it to the computer and setting the communication parameters according to the relevant guided procedure.



The following operations are available on the selected instrument:

- Modifying the communication parameters.
- Viewing statistics and instrument status.
- Viewing the instantaneous values.
- Saving all elaborated data in the *Gidas* database used by *GidasTEA* program.
- Importing data downloaded from the instrument to binary file on the *Gidas* database used by *GidasTEA* program.
- Viewing the quick guide to instrument use.

The program uses the automatic recognition mode so once sensors are connected to the instrument the user can start to download elaborated data.
To create and send to the instrument a specific configuration, configure different supports for data storage (e.g. a text file) or to operate more complex functions You need to use *3DOM*. .

WARNING
If using Instrument Manager and 3DOM at the same time it might be necessary to mutually update its visualizations. If a new instrument is introduced in 3DOM, to see it in Instrument Manager guided procedure you have to select the <Refresh> button.

For further information on Instrument Management, its configuration and its use, refer to the related manual (SWUM_00649 available on MW6501 LSI LASTEM DVD products).

For further information on *Instrument Manager* program refer to the relative on-line guide.

4.3. Configuration of program to open report file

The program is used to create reports with the results of calculations in *Office Open XML* (ECMA-376) standard format. It is supported by:

- *Word 2007* (native)
- *Word 2000* or higher by installing the *compatibility pack* (http://office.microsoft.com/en-us/products/HA101686761033.aspx)
- *OpenOffice 3.2 (*http://www.openoffice.org/*)*
- *SoftMaker Office* or the free version document viewer *TextMaker* (dimension: 5 MB) (http://www.officeviewers.com/)

The choice of standard format let the user free to use his favourite program to view, modify and print out report files.

Choose the menu *Options* → *Report Settings* to open the window for report file configuration.
In the *General* file you can view the predefined program installed on your computer associated with *Office Open XML (.docx*) file. In case of absence of any associated program, press the < *Select*> button to open the window to select programs (this window is accessible only if no predefined program exists in association with .docx file).

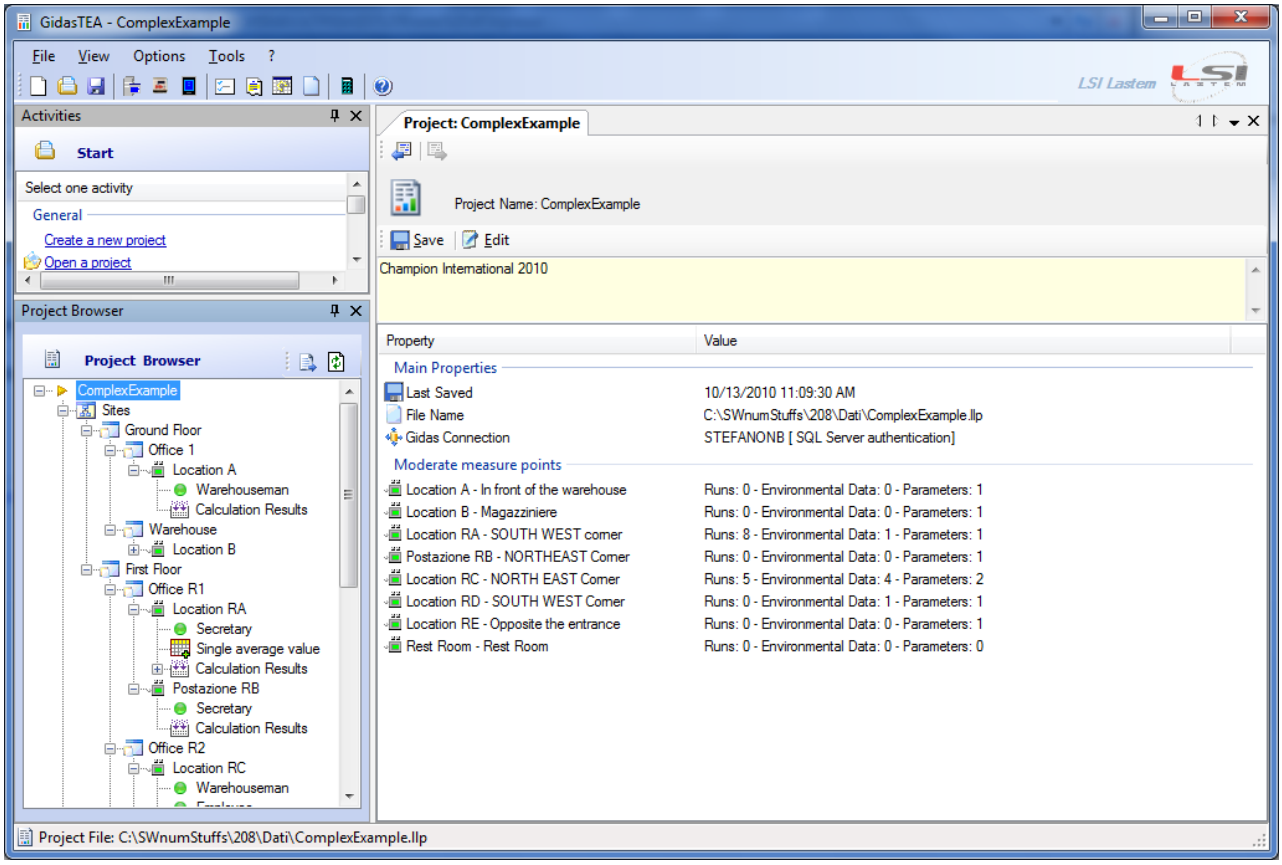
This window offers few options; chose one solution or install a program able to manage *.docx* files.

Press <*Select*> to associate a program previously installed on the computer to *.docx* file.

5. Program use

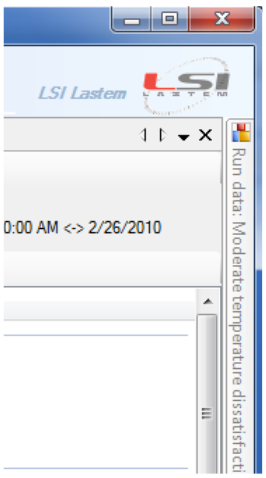
5.1. User interface

After starting the program and loading a calculation project, the window appears as follows:

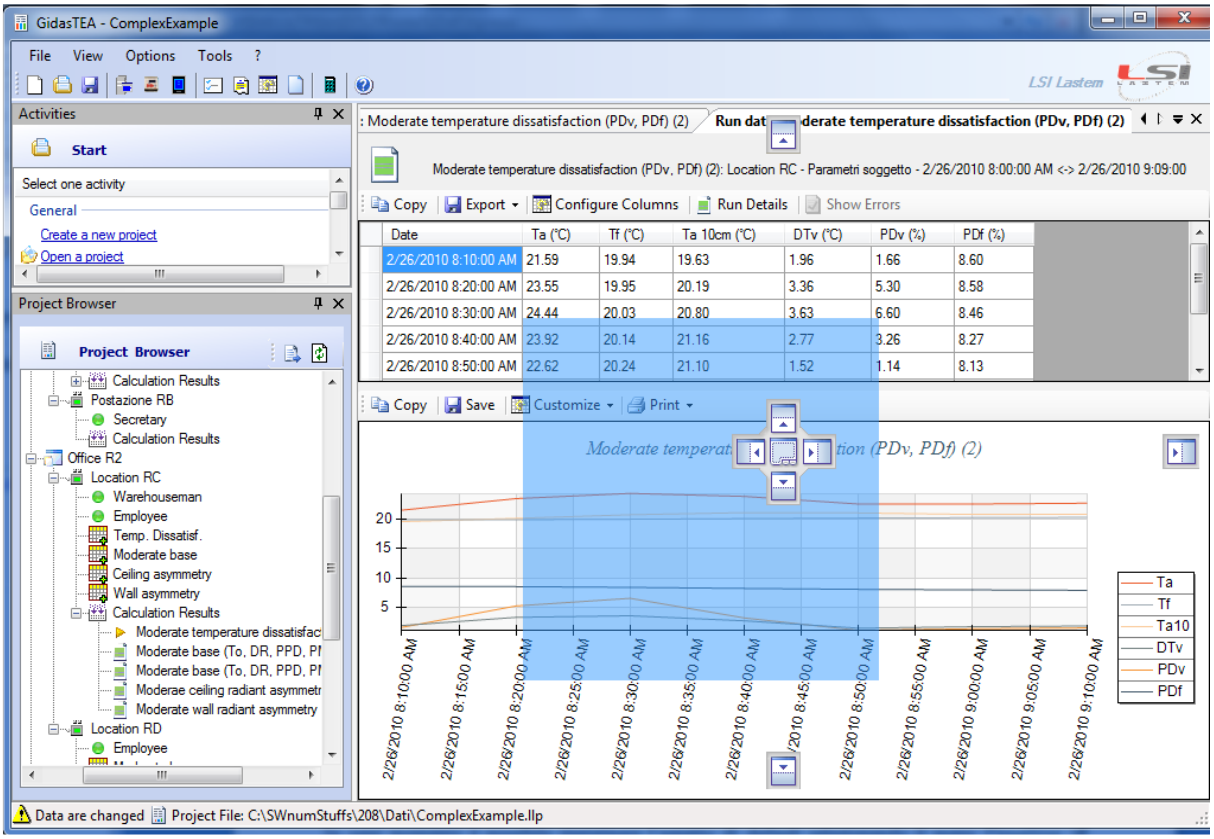


You might see different screen views because these windows are adjustable:

- if the icon is present on the file bar, the window is always visible. The icon indicates that the file automatically hides once it is not selected showing only the logo secured next to the main window; to refresh the window just click it.



- you can move and save windows in different positions on the screen by carrying the title bar; during this operation you can view the new available positions for anchoring.



In every moment you can restore the default layout selecting *View* → *Reset Default Layout*.

5.1.1. Menu

The program presents these menu:

File

- *New*: opens a new project.
- *Open*: opens an already existing project.
- *Save*: saves the actual project.
- *Save As*: saves the actual project under a different name.
- *Change Data Source*: views the window to change *Gidas* database source used by the program.
- *Refresh Data Source*: updates all data loaded by *Gidas* database; use this action to save for the first time the instrument database once the program is already installed.
- *Recent Projects*: views the lists of projects recently opened.
- *Exit*: closes the program.

View

- *Quantities Measures Association:* opens the window showing the available instruments and those where the association of measures and standards used for the calculation is already configured.
- *Properties:* opens the main properties window showing the details of the selected object in the project.

- *Activities:* opens the activity window.
- *Reset Default layout:* resets the standard layout after modifying the windows position.

Options

- *Microclimate Settings*: shows general settings for calculations.
- *Report Settings:* shows the window with report management settings.
- *Export to Text File Settings*: shows the window with settings to format date and numeral values to export data to text.
- *Data Table Format Settings:* shows the window to set formats for data tables.

Tools

- *Instrument Manager:* opens the application for the management of the instrument used for calculations.
- *User Surveys Removing Manager*: opens the application managing the removing of the user surveys.
- *Subject Library:* manage the library of the subjects defined by the user.
- *Microclimate Calculator:* activates the calculator for microclimatic indexes.
- *License Manager:* starts the License Manager program.

?

- *Contents:* shows the User Manual program.
- *Show Tutorial:* views the guide step by step to start up and use the program.
- *Check for Updates:* starts the research for new updates available for the program.
- *About:* show all info related to the program.
- *About Gidas Database:* shows info about the connected *Gidas* database.

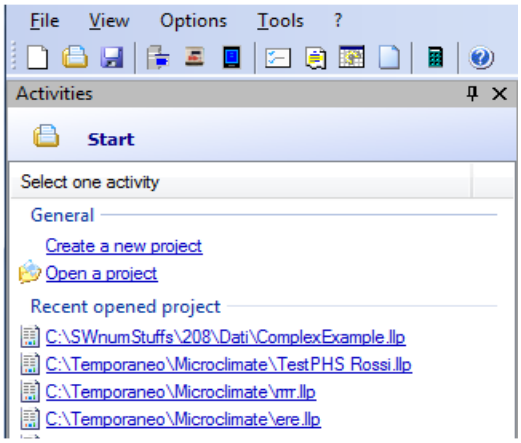
Some of these Menu commands are available on the toolbar below the main menu window. Point the mouse on a button and wait shortly before viewing the related short description.

5.1.2. Wizard procedures

All the actions for modifying or adding objects in the running project are performed following a wizard procedure, making the import of the requested info simple and clear.

5.2. Activities window

The activities window is the program start up: shown in *View* → *Activities* menu (always appears when the program is started for the first time) and it shows a list of projects recently opened and the options *Create a new project* and *Open a project*.



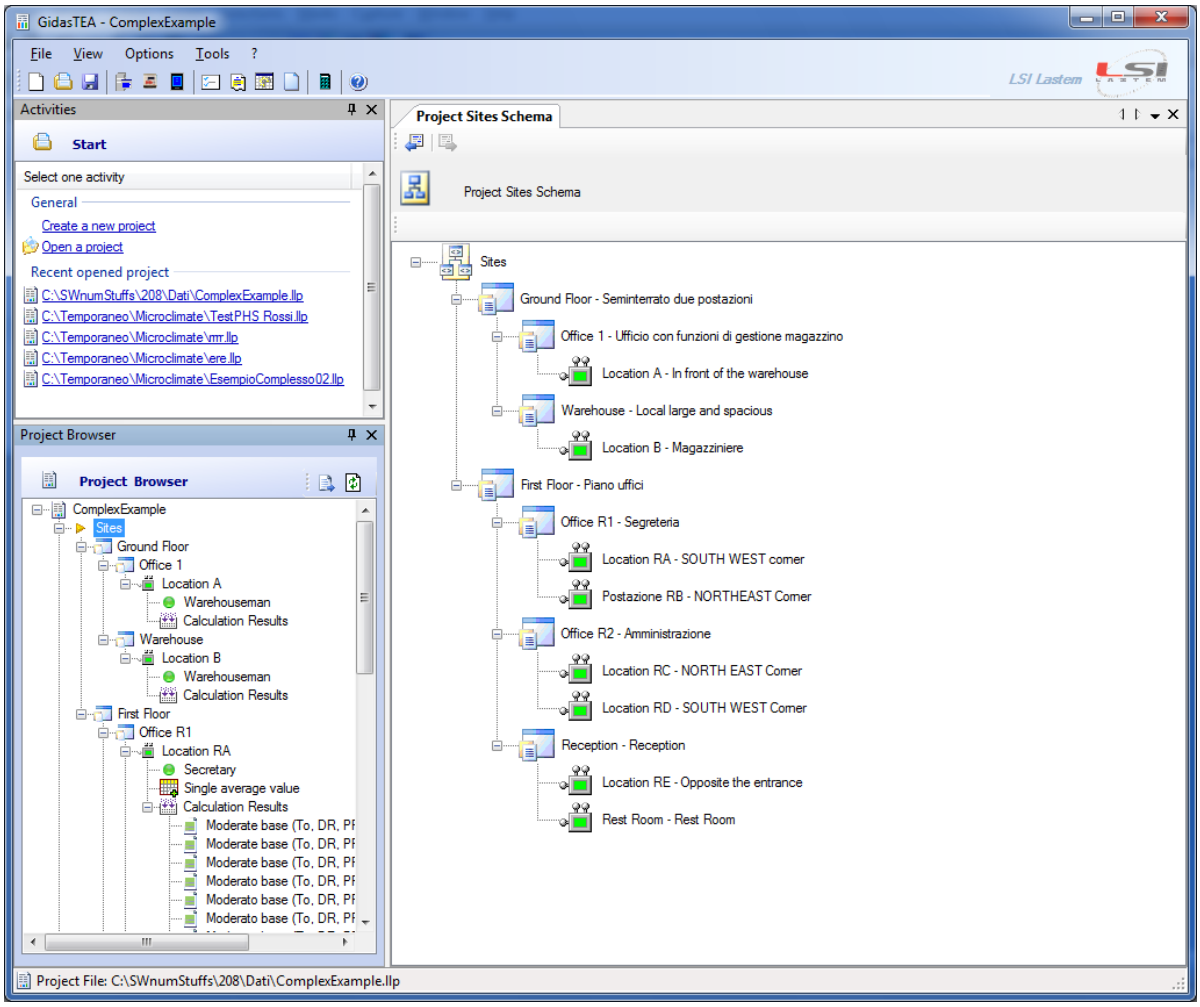
Use the mouse to select your favourite element.

5.3. Projects

To make a calculation you need to open an already existing project or to create a new one.
Select *File* → *New* menu or *Create a new project* in the activities window to open a new project.
To open an existing project select *File* → *Open* or *Open a project* in the Activities window.

A project for thermal calculation allows the description of the operational location in details dividing into different areas identifying the measure points from where measurements and calculations will be done.

In a situation of this kind, the thermal project will include two main areas, the *ground floor* and the *first floor*; each of these areas (named *Site* in the program) it contains few other spaces (*Office* and *Warehouse* on the *Ground Floor*, *Office 1*, *Office 2* and *Reception* on the *First Floor*); each of these areas will cover one or more measure points where the calculations will be carried out.



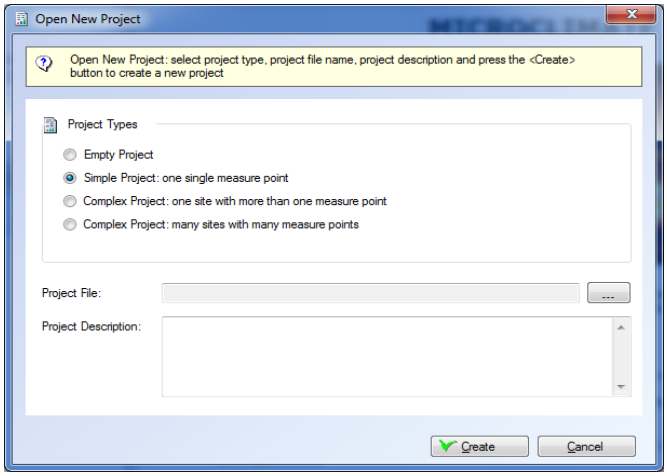
5.3.1. Terminology

The definition of a project uses the following terms:

- *Site*: it is the area where is possible to divide logistically the project; the *Sites* are used only to make a project clearer and they might correspond to the various areas of the building that we are analyzing.
- *Measure Point*: is the point where the environmental data measurement are taken and the calculation of thermal indices is made; it is typically located close to the post where the subject operates.
- *Environment*: represents the sort of microclimatic environment (e.g. *Moderate*) characterizing a measure point and its related data.
- *Environmental data*: represent the environmental parameters measured by the instrument; the data time lap can be the same through the user evaluation operated directly by the instrument (if R-Log like instruments are used) or a part of it.
- *Subject Parameters (or Subject)*: represents the subject of the calculation, characterized by required parameters for the relative calculation (*activities, clothing, mechanic efficiency….)* that can change according to the environment.

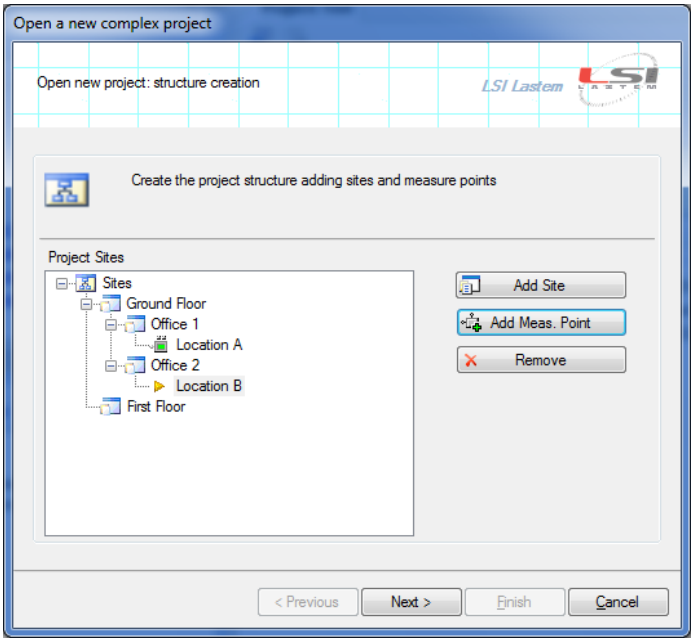
5.3.2. Creating a new project

To open a new project select menu *File* → *New* or select *Create a new project* from the Activities window. This action logs the *Open New Project* wizard window:



The procedure enables the creation of different projects types from the simplest (one measure point project) to the most complex, like the one described in previous paragraphs. You have to select the project file name.

Once the project type has been selected the program starts up the specific wizard procedure to create a new project of the selected type. In case of complex project it is possible to build up the structure of the different sites and different measure points according the architecture of the location:



Once the wizard procedure is completed, the program will save the project in the indicated file and shows the project in the *Project browser* window where you can add new elements or modify and remove the stored data.

WARNING
The initial choice of the project type is used only to generate the starting points: even a simple single measure point project can be expanded to a complex multi-sites and multi-points project.

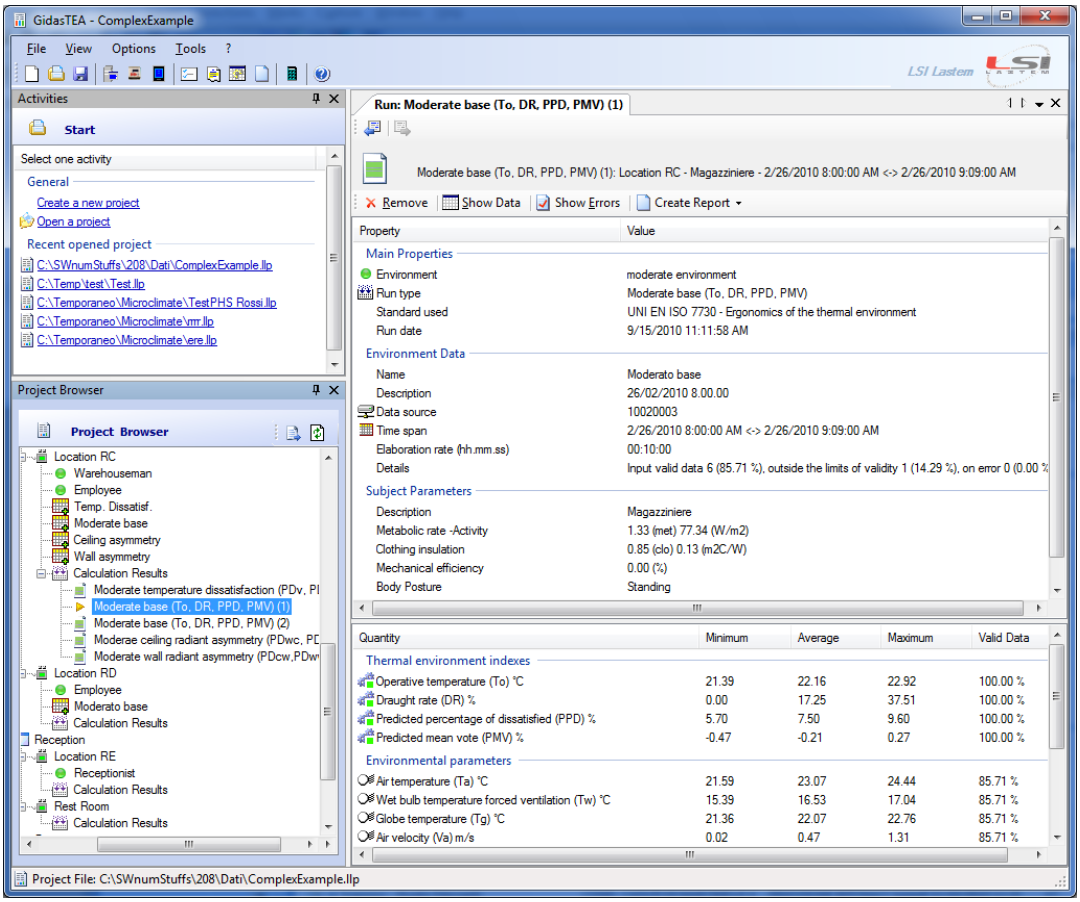
5.3.3. Project browser

The project browser window represents the main view on the project. The browser shows in a knot structure the sites, the measuring points and the list of defined subjects.

Each of the present elements appears under a different icon:

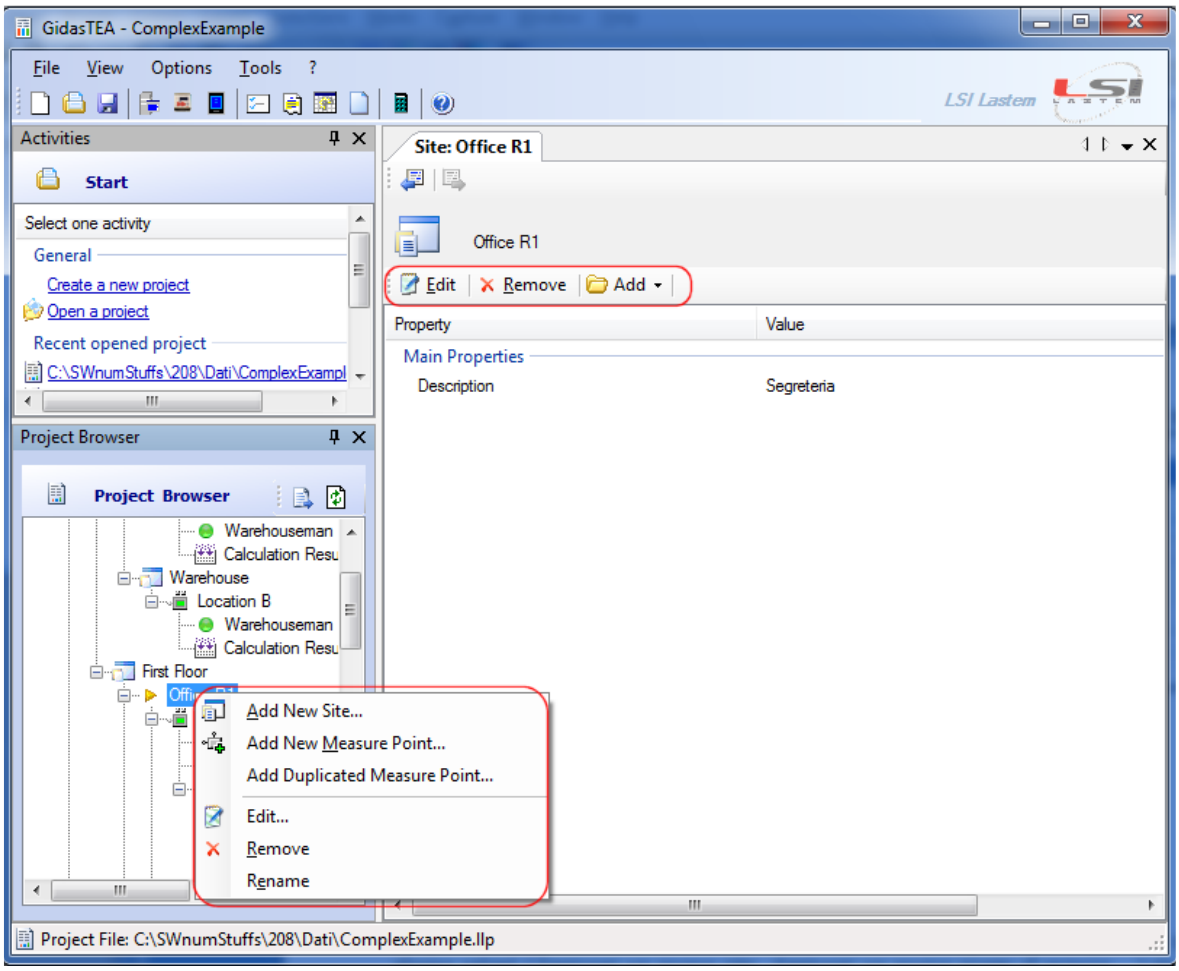
-  represents the collection of sites and measuring points of the project.
-  shows a site.
-  shows a measuring point; the green colour indicates moderate environments, the red colour indicates hot environments, the blue indicates cold environments.
-  views a selection of environmental data used for calculations.
-  indicates a selection of user defined data used for calculations.
-  views the collection of calculation results in a measuring point or in a PHS configuration.
-  indicates a calculation result; the green colour for moderate environment calculations, the red colour for hot environment calculations, the blue colour for cold environment calculations.
-  shows the collection of microclimatic subjects available for the project.
-  indicates a microclimatic subject; the green colour for moderate environment subjects, the red colour for hot environment subjects, the blue colour for cold environment subjects and grey colour for rest area subjects.
-  stores a collection of PHS configurations set for the project.
-  indicates a single PHS configuration.

After an element is selected in the project browser, its characteristics will be displayed the properties window.



In this view the selection of a calculation in the project window determines the view on the *Properties* window on the right side.

You can use the contextual menu for each element or press the <*Properties window*> buttons to add, remove or modify the selected elements.



In this example one site has been selected (Office1): it is possible to perform a few actions (*Add new Site*, *Add new Measure Point*….) on this element from the contextual menu or pressing the buttons on the top bar of the relative *Properties window*.

5.4. Measuring points

The measuring points represent the main part of a project and correspond to the actual location where the environmental data are measured.

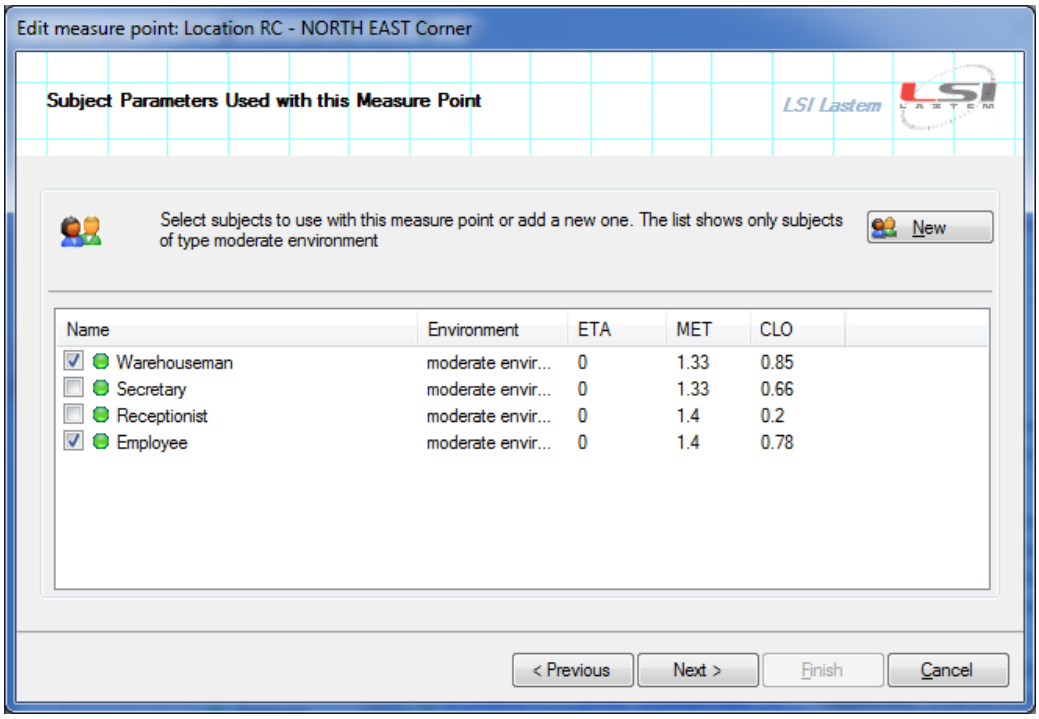
In a project, each measuring point is the starting point for calculations and is defined by a set of measured data and the subject parameters .

Each measuring point is associated with a type of thermal environment:

- Moderate
- Cold
- Cold rest (calculation of Drec)
- Hot
- PHS rest (for the PHS calculation)

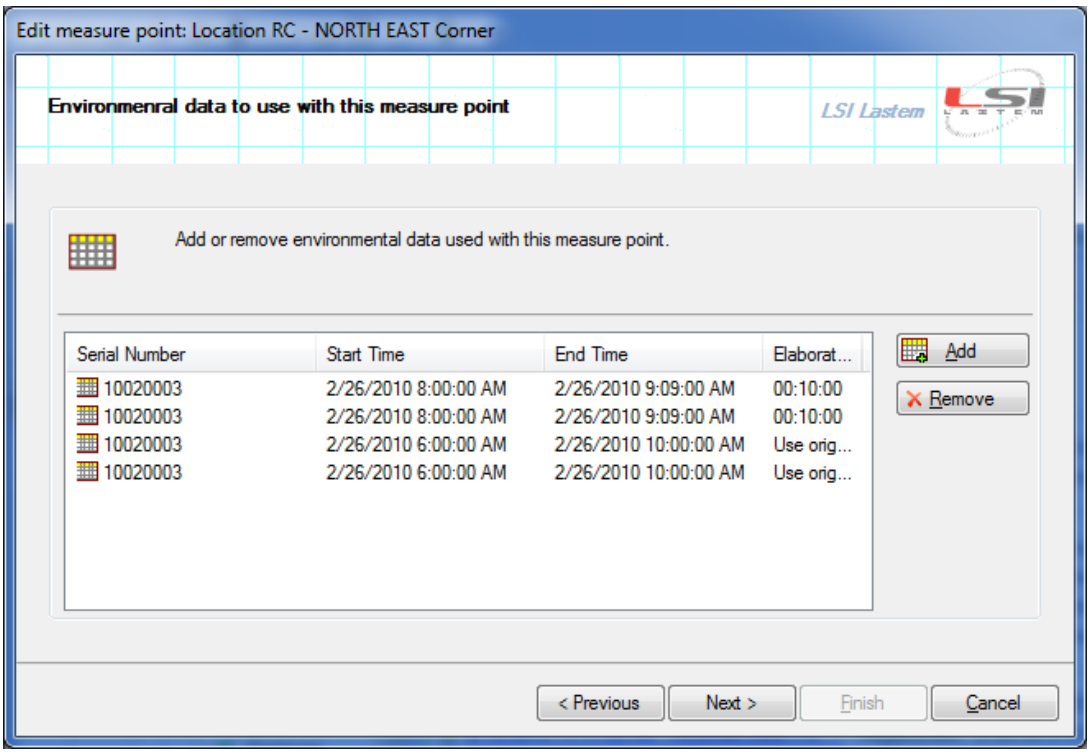
5.4.1. Adding a measuring point to a project

It is possible to add a measuring point to any project *Site* or directly below the main project knot *Site*.
In the first screen view the wizard procedure require to specify the name, the description and the thermal environment (moderate, hot, ...) of each measuring point. In the second screen view you can specify the subject parameters to be used in this measuring point:



The window shows the subjects already imported in the project and compatible with the selected type of environment. You can select one or more subjects from the existing ones or create a new one pressing the <*New*> button: the new subject is stored in the project and it is available to all measure points compatible with the selected type of environment relative to the subject. Each measuring point can utilize more subjects. You can continue without adding any subject.

The wizard procedure will request the environmental data to be associated with the measure point:



The window shows the environmental data already associated with the measuring point. You can remove one element or add new data. Each measuring point can contain different sets of environmental data. You can proceed without importing any data and insert them after.

NOTE
Subject parameters are defined at the project level and can be shared among different measuring points; environmental data are exclusively defined at the measuring point level.

At the end of the wizard procedure you can make the calculations selecting menu *Run* on the measure point in the browser or in the Properties window.

5.5. Subject parameters

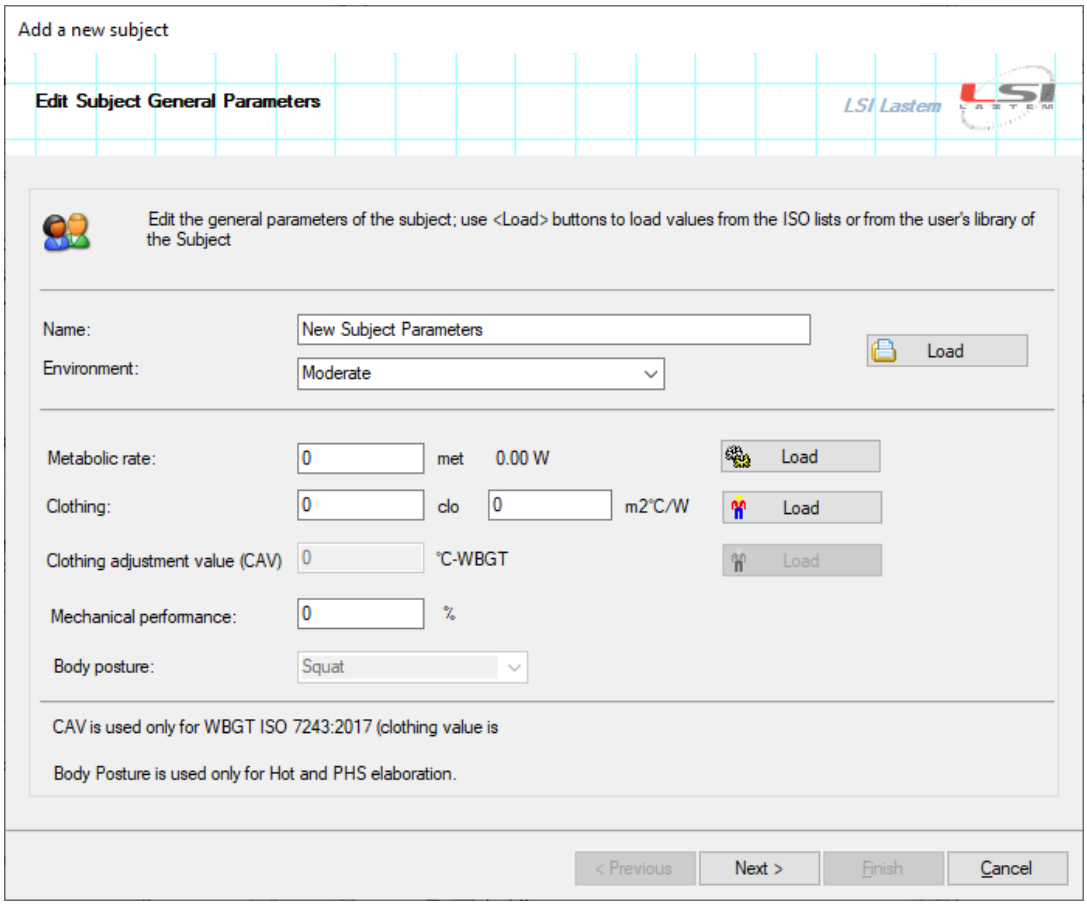
The largest number of thermal calculations requires the definition of a *Subject* according to a series of parameters such as *Activity*, *Clothing* and *Mechanical performance*.

The program allows the definition of different subjects at the project level so that the same subject can be used for different measuring points.

5.5.1. Adding a subject to the project

To add a subject to the project select the knot *Subject Parameters* from the project and press *Add* from the contextual menu.

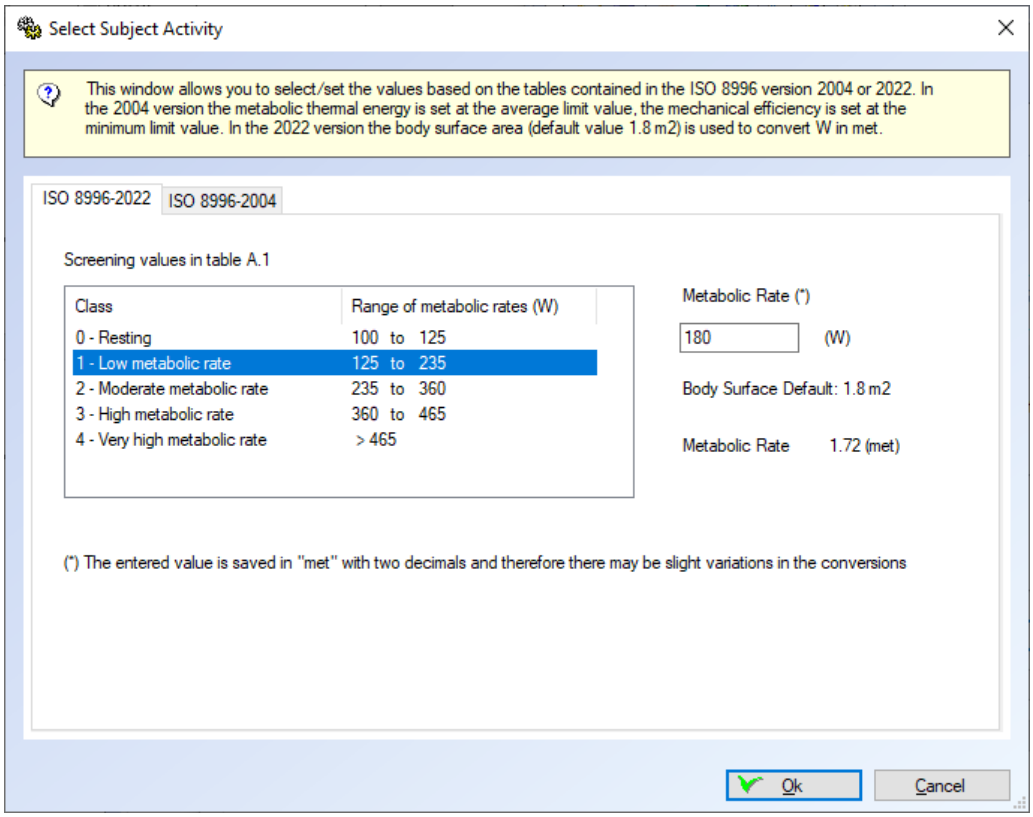
The wizard procedure to import or modify a subject displays a window to edit the general characteristics of the subject (Name, Environment, Activity, Clothing, Mechanical performance, Body posture):



The <*Load*> button at the top allows you to load a subject from the library of user-defined subjects.

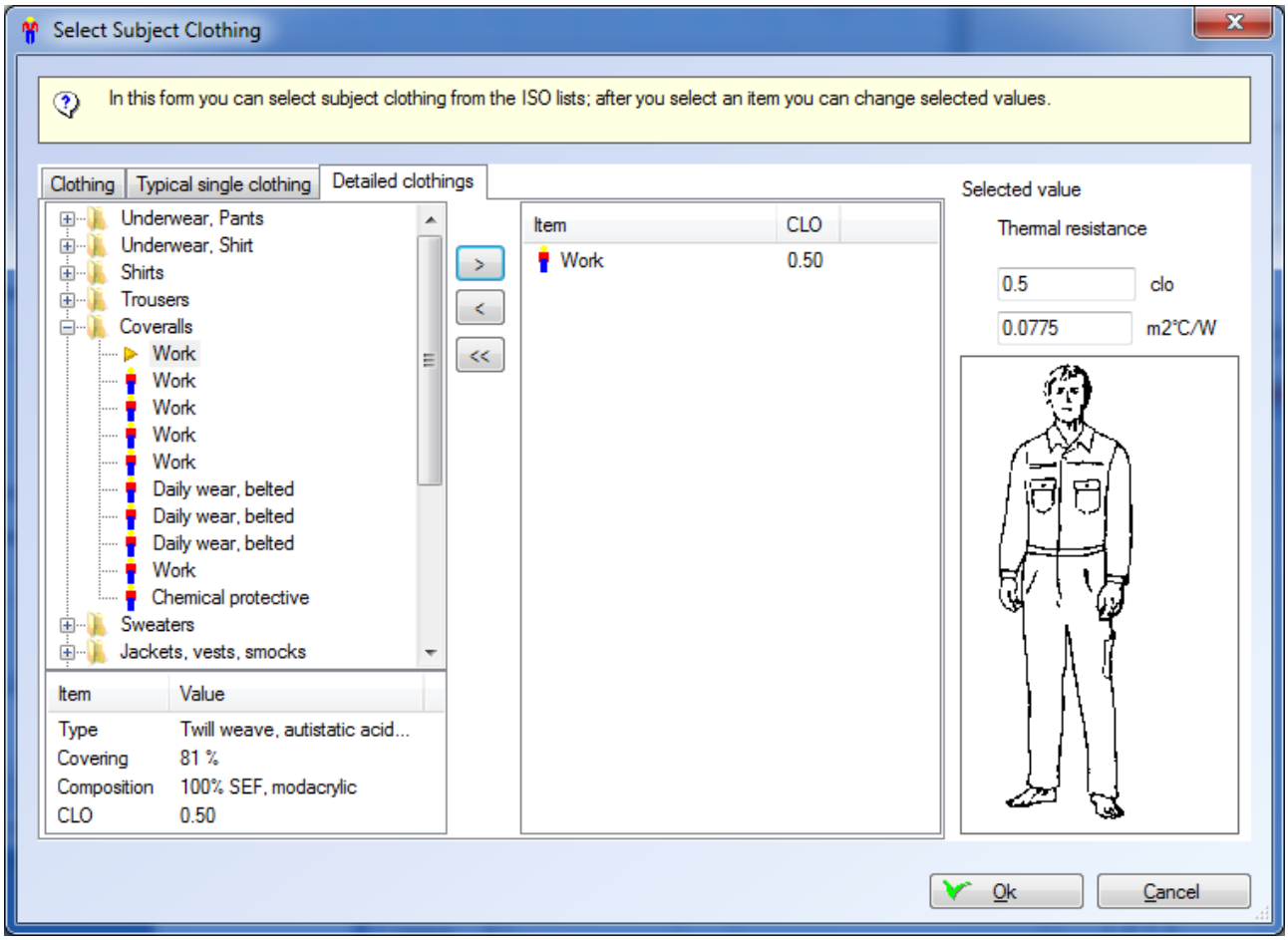
The <*Load*> buttons present in the central part allow you to load the *Metabolic rate* and *Clothing* data from the lists present in the standard:

- In the selection of the *Metabolic rate*, both the tables included in the old versions of the standard (select by occupation or select for typical activities) and the simpler one included in the 2022 version of UNI EN ISO 8996 are present:



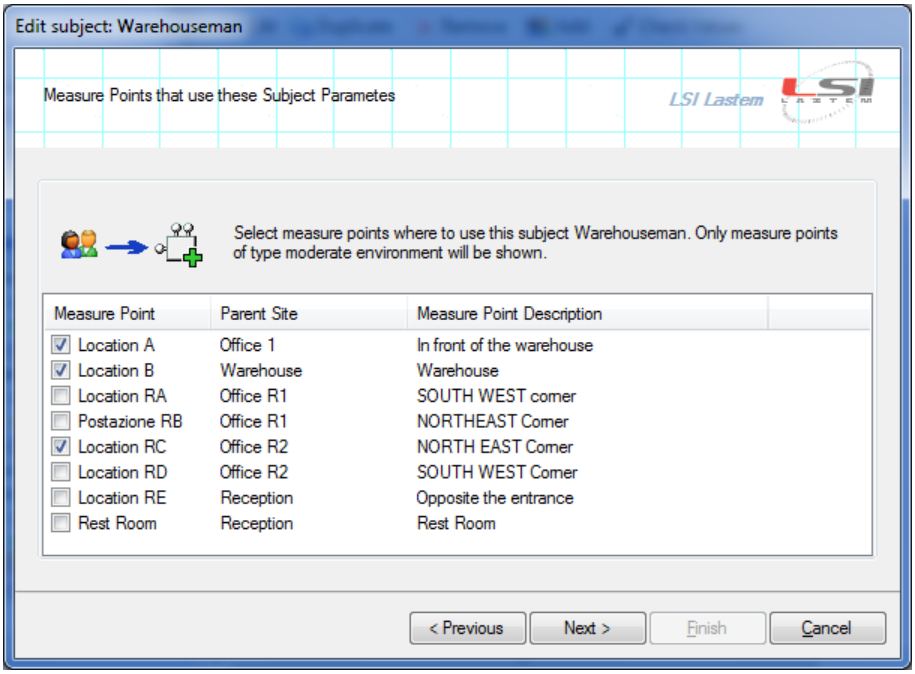
The *GidasTEA* program saves the value of the metabolic activity in *met* so as not to depend on the subject's body surface area to preserve the generic nature of the subjects included in the projects. Since in the new version of the standard the metabolic activity is expressed in *Watt*, the conversion to the met value is carried out using the default value of the body surface area (1.8 m^2).

- It's possible to select the clothing level, by choosing between typical complete working outfits or by detailing every single piece in detail; in this case the window will display original pictures taken by the relevant ISO standard.



The *CAV* and Body *posture* parameters are used only in the calculations concerning the Hot environments. The <*Load*> button on the *CAV* parameter allows to initialize the value according to the table reported in the standard (Appendix F).

After defining the subject parameters, a second window will show the list of the environment measuring points already defined in the project applicable to the specific subject.

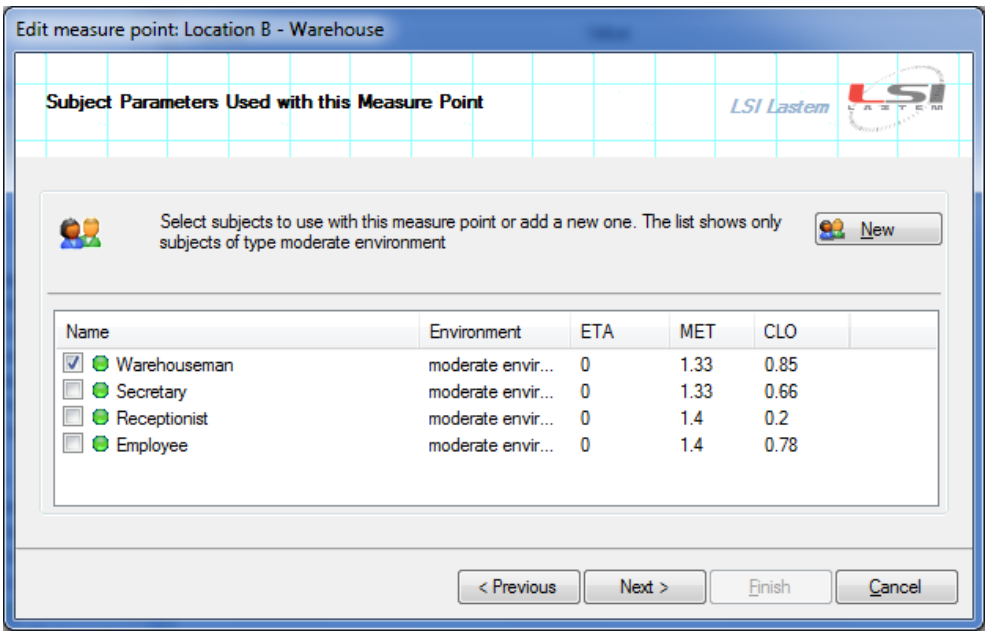


Only the measuring points of an environment compatible with the environment of the subject we are adding or modifying.

5.5.2. Adding a subject to a measure point

To add a subject to a measuring point, select the measuring point in the project browser and then click *Add Subject* from the contextual menu.

The wizard procedure shows all the subjects present in the project compatible with the environment of the measuring point.

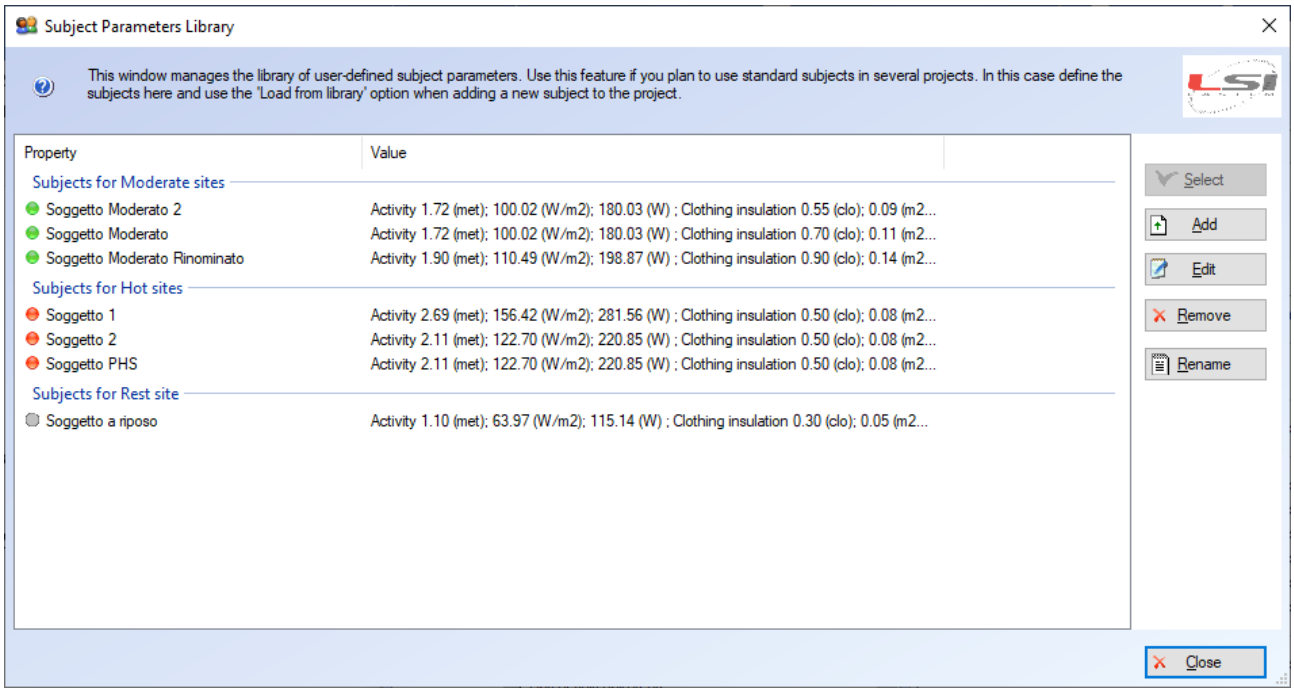


In this window you can select the subjects to use in this measuring point or you can create a new one pressing the <*New*> button.

NOTE
The new Subject will be imported into the project and linked to this measure point.

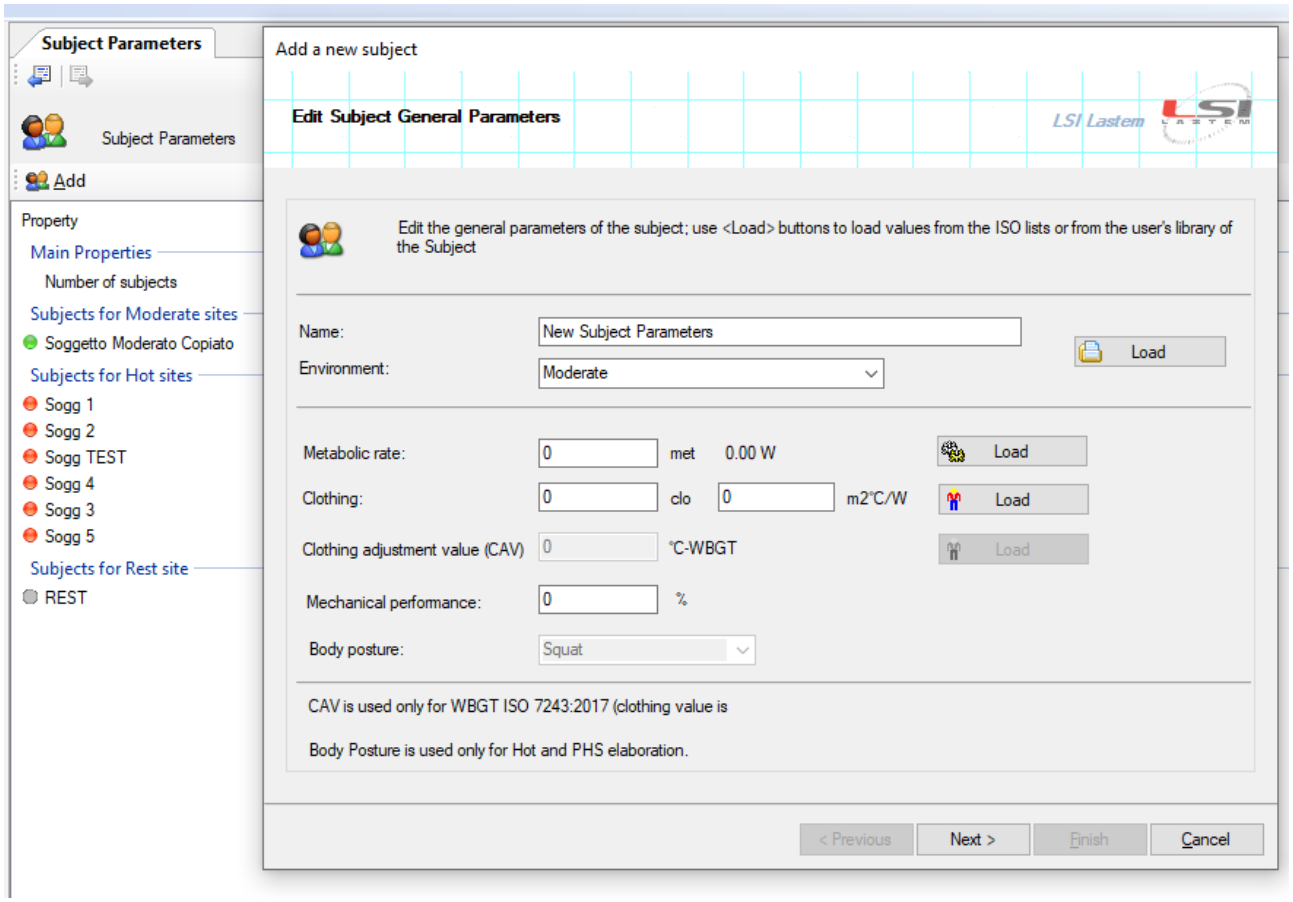
5.5.3. The subject library

In the new version of the program, the user can create a library of subject parameters to be used in various projects. This function is useful if you use the same standard subjects in different projects because it allows you to avoid inserting the same subject in every project.
The function is accessible from the *Tools -> Subject Library* menu:



Use this window to *Add*, *Edit*, *Remove* or *Rename* a subject from the library.

Within a project, when you select the option to add subjects, use the *Load* button to open the subject library management window, select one and load it into the project using the *Select* button:



Please note that once loaded into the project, the subject no longer has any connection with the library and any changes made to the subject at project level do not affect the subject present in the

library, just as any changes made to a subject in the library do not affect the projects where that subject has been uploaded.

5.6. Environmental data

To perform a thermal calculation you need to measure environmental parameters and download the data in the *Gidas* database.

To start the management program of your instrument select the *Instruments* → *Instrument Manager* menu or the  from the command bar (§5.2).

5.6.1. Identification of the measured data

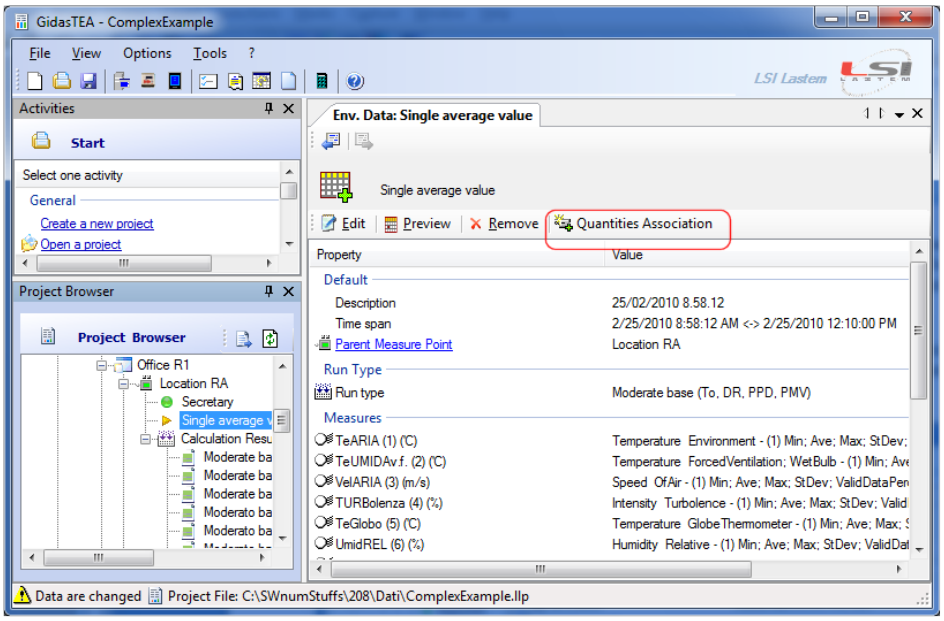
E-Log and *R/M-Log* instruments merge the measure data to the configuration set at the time the measurements are taken.
When you select the data downloaded in the *Gidas* database it is always required to choose the configuration carrying the measure data among those available.

The creation date and an extensive description identify all configurations. If the configuration is one of those supplied by LSI LASTEM, or generated from them, the description indicate its compatible microclimatic calculation.

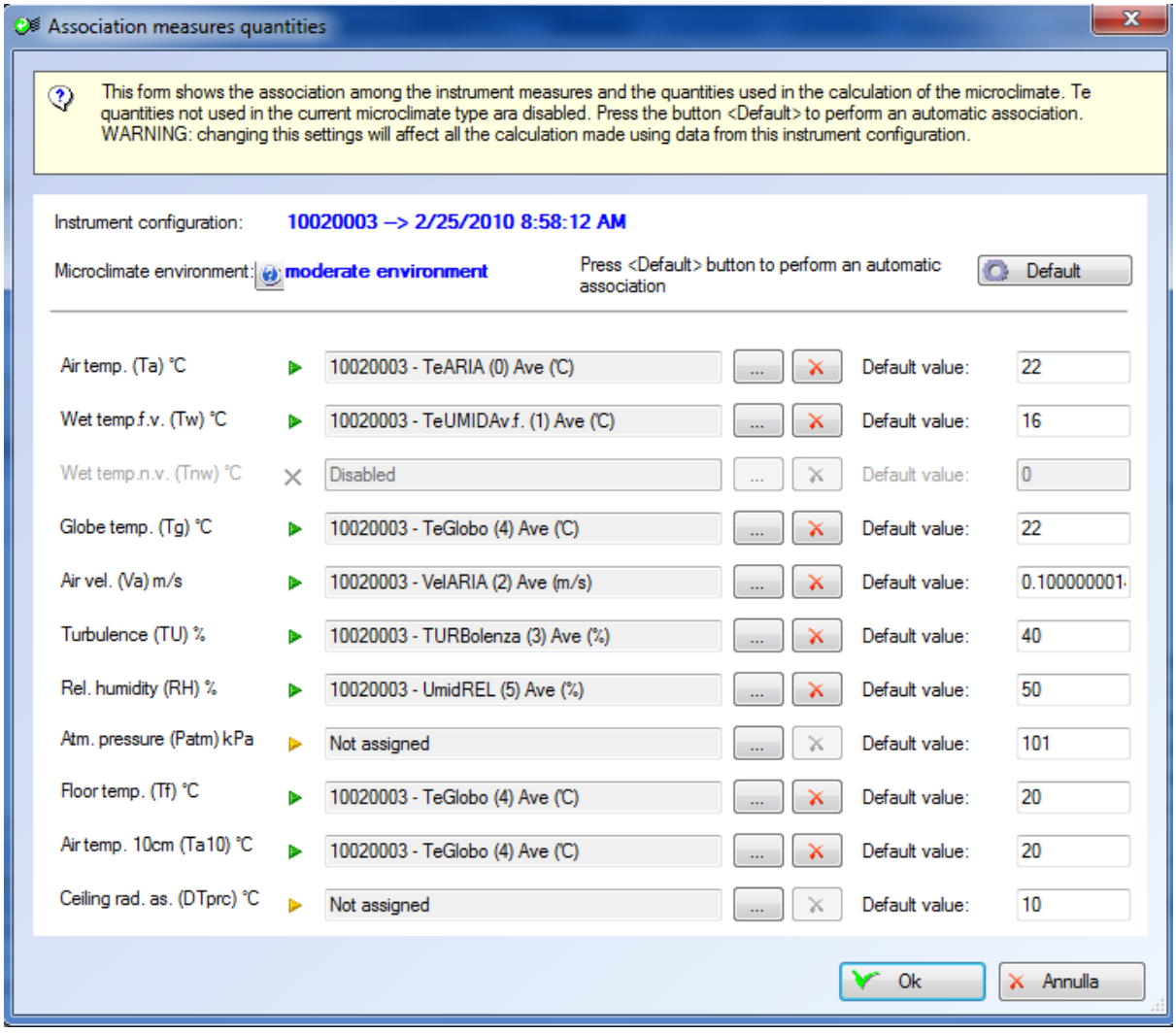
5.6.2. Association of measures to quantities

You need to associate the correspondence between measured values and calculations quantities to each configuration of your instrument. If you use a default configuration or the automatic recognition mode *Instrument Manager* automatically will perform this association once the data are downloaded for the first time.

To create or manually modify the association of measurements and calculation quantities press <*Quantities Association*> button from the single value of environmental data relative to the instrument you want to configure.



This button opens the association window showing for all the used calculations values relative to a specific microclimatic environment the associated measured channels and the default values to be used in case a measure data is missing:



The <*Default*> button starts the wizard procedure to select the most suitable association based on the characteristics of the instrument configuration; for each given value you will have the associable

measures listed according their compatibility grade express on percentage. The association is proposed when a measure and a quantity share an equal grade or higher than 95%. For lower values the user has to decide the appropriate association; if it is not possible to associate a measure to a quantity, a predefined value will be used.

The  button allows selecting the association manually; the  button removes it.

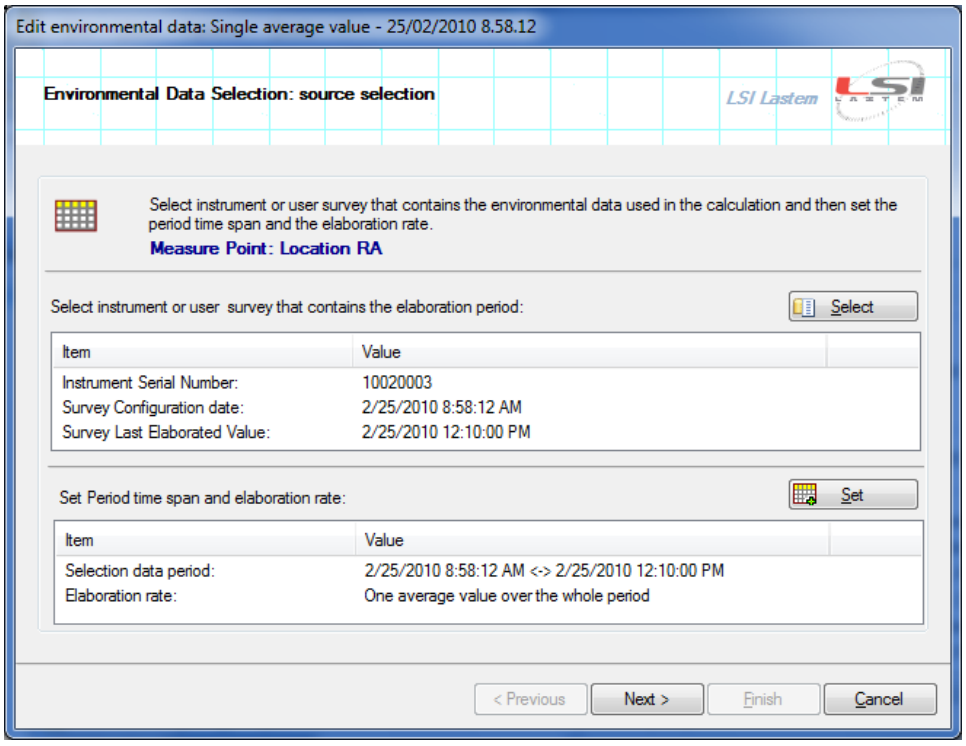
The  button displays the types of calculations available for the selected type of environment and the quantities you need.

NOTE
The association of measures and calculated quantities can be performed only once for each instrument configuration.

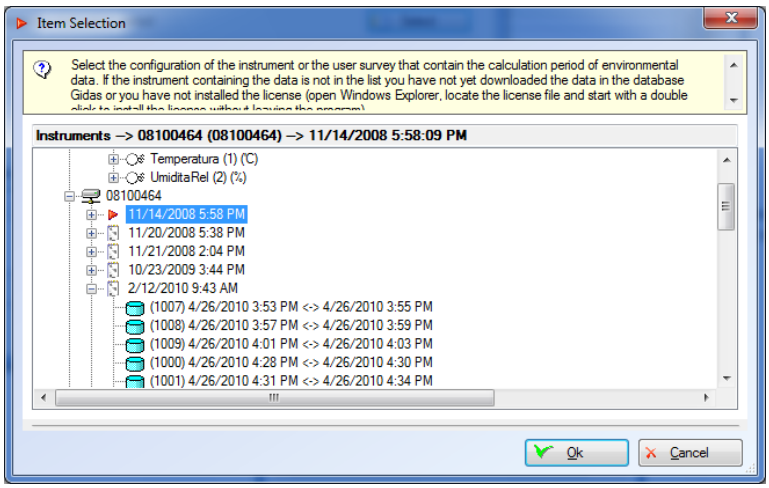
The menu *View* → *Quantities Measures Association* displays all (licensed) configured instruments present in the computer and shows for each instrument configuration if the association of measure and quantities used in the calculation is present or missing.

5.6.3. Adding a selection of environment data to a measure point

To add a selection of environmental data to a calculation, select the measure point in the project window and select *Add Environmental Data* from the contextual menu or <*Environmental Data*> button in the Properties window of measure point. This selection opens the wizard procedure to add the environmental data selection:



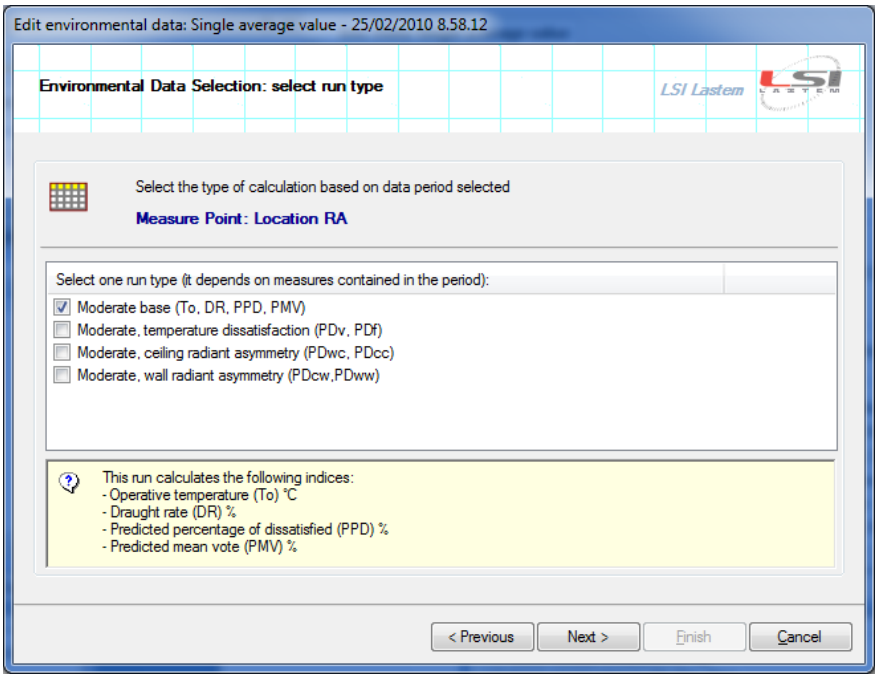
Pressing the <*Select*> button you can select the configuration of the instrument used to measure the data for calculation; it is possible to select directly the user survey if the instrument supports it (see R-Log manual).



This window displays the instrument serial number 08100464 configured on 2008/11/14 carrying different user survey data. You can select both the configuration and a single user survey: the selection sets the selection period data. If available, the description of the instrument configuration will be displayed.

The <*Set*> button edits the preview of selected data: if the instrument has already the association of measures and quantities, the preview shows the measures to use for the calculation or all the recorded measures from the selected configuration.
The preview window enables a more precise selection of the period to be used for the calculations.

Once data are selected you have to select the type of calculation to perform:



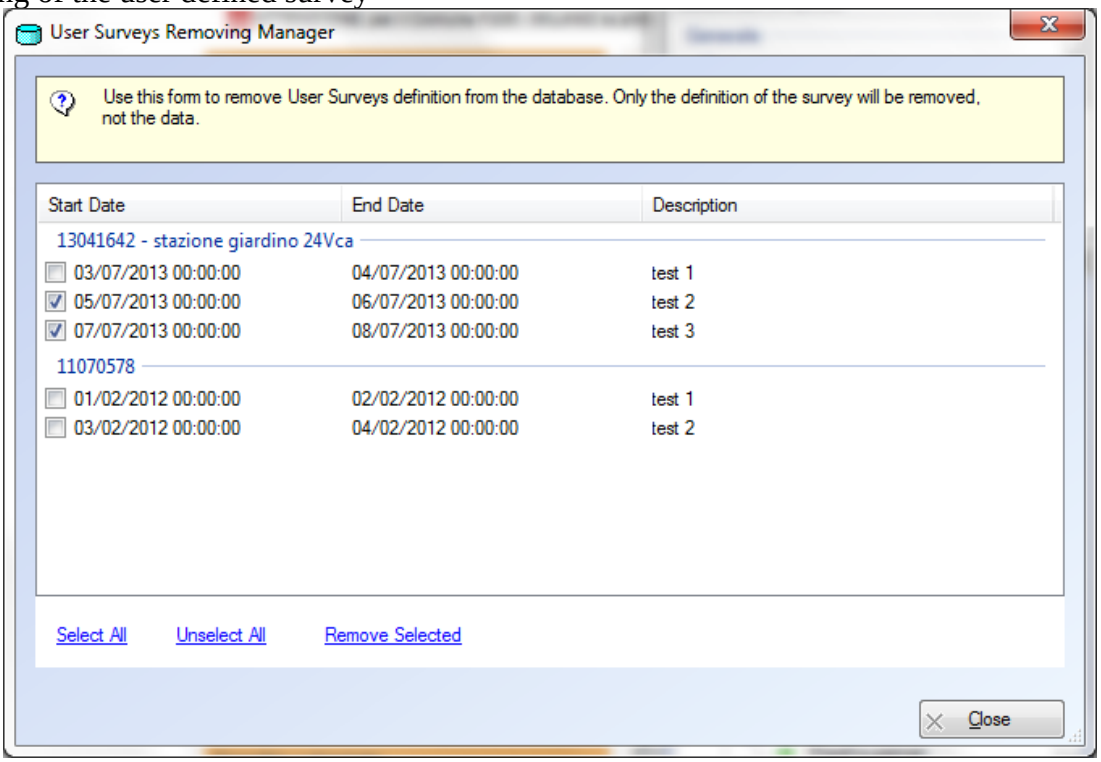
The selection of the type of calculation depends on the environment of the measure point (moderate, hot, cold)

NOTE
To add environmental data to a measure point, you have to select the type of calculation to perform according with the configured sensors when data have been downloaded in the instrument.

The data used for the calculation of the PHS are also sufficient for the calculation of the one level WBGT.

5.6.4. Removing User Defined Surveys

Select the menu *Tools* → *User Surveys Removing Manager* to show the windows that manage the removing of the user defined survey



Press the *Remove selected* link to remove from database selected surveys.

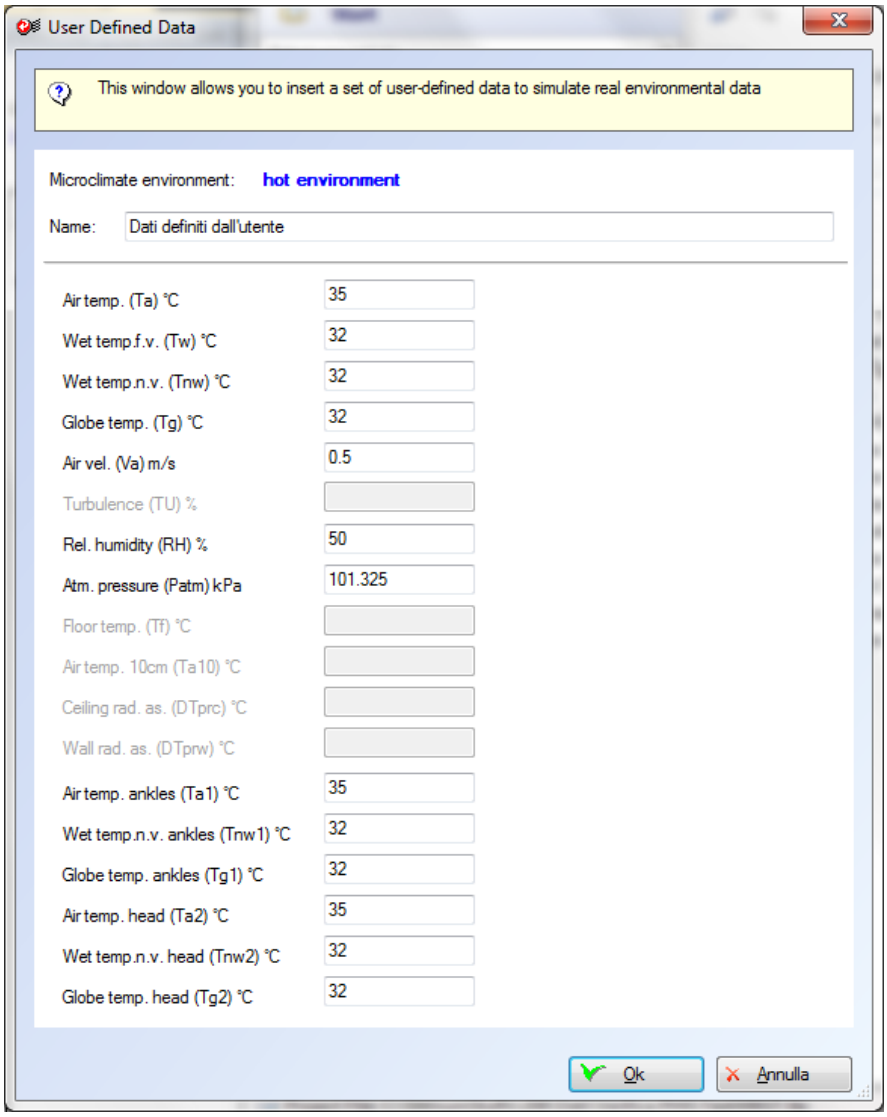
NOTE
Removing a Survey from the database means removing only the definition of the survey, not the data.

5.7. User defined data

In addition to using environmental data measured by instruments, it is also possible to perform calculations using simulated data entered by the user.

5.7.1. Adding user defined data to a measure point

To add a selection of user defined data to a calculation, select the measure point in the project window and select *Add User Defined Data* from the contextual menu or *<Environmental Data>* button in the Properties window of measure point. This selection opens this windows:



In this window enter a name to identify the data set and a value for each variable used in all calculations that are possible in the selected environment (in this case the moderate environment).

5.8. Data measured by Heat Shield

Heat Shield is the datalogger developed by LSI LASTEM for the risk assessment of the thermal stress in work environments through the calculation of *WBGT indoor & outdoor* indices.

To use GidasTEA with the measured data from Heat Shield using the program HSManager is necessary:

- Install in GidasTEA the license of the Heat Shield datalogger
- Install the program HSManager on the same computer where you installed GidasTEA
- Use program HSManager to download data from the Heat Shield
- Use the data export function in GidasTEA of the program HSManager to export the data in the Gidas database used by GidasTEA

WARNING
It is NOT required to configure the datalogger in the Instrument Manager.

5.9. Calculations

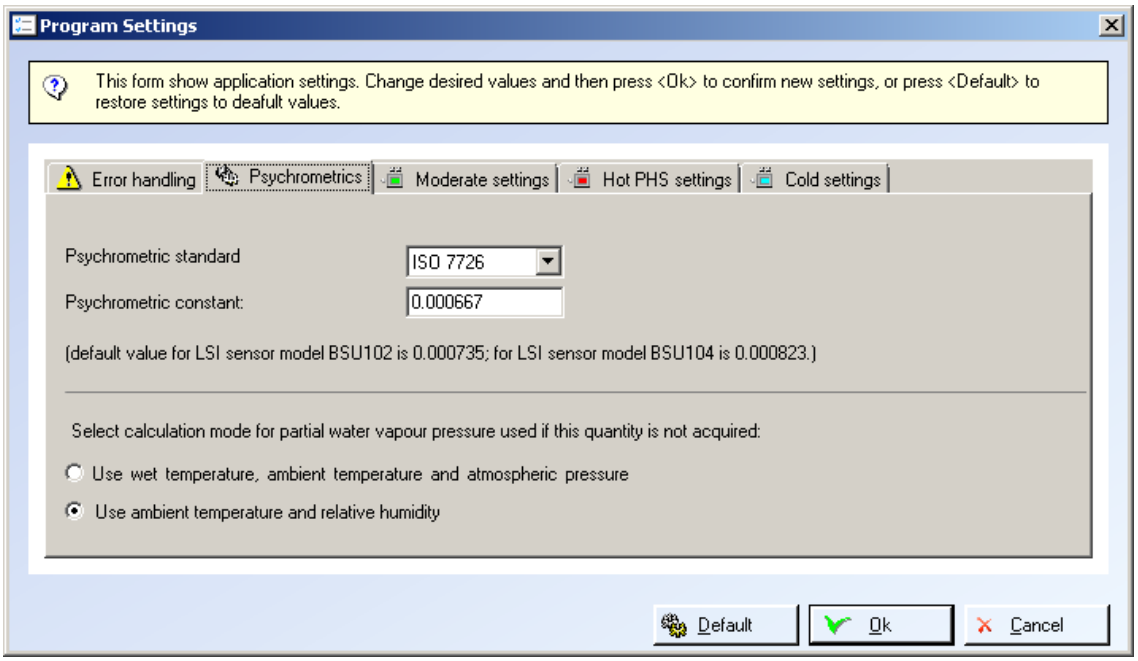
5.9.1. Configuration options

To modify the configuration options for calculations select menu *Options* → *Microclimate Settings* to view the program settings to configure:

- psychrometrics;
- error handling;
- different types of calculations settings.

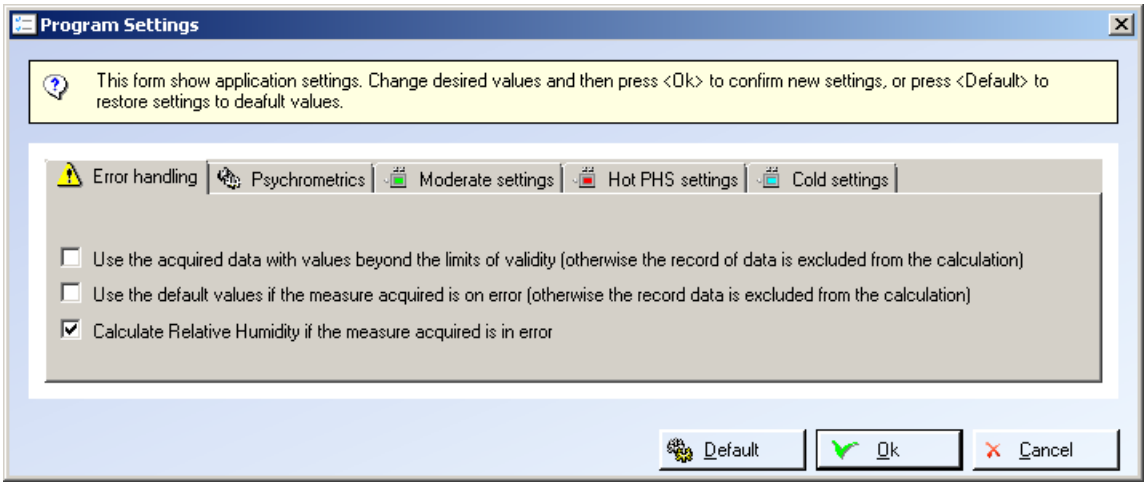
5.9.1.1. Psycrometrics configuration

The *Psychrometrics* form *in Program Settings* window shows the available options*:*



5.9.1.2. Error handling configuration

The *Error Handling* form *in Program Settings* window shows the available options for error handling:



It is important to understand the use of the first two voices:

- *Use the acquired data with values beyond the limits of validity*: if you do not select this voice and just one parameter exceeds the limits of validity set by the standard, the record of environmental data will be excluded from the calculations; by selecting this voice the calculation will be strengthen even if the entry data go beyond the validity limits set by the standard.
- *Use the default values if the measure acquired is an error*: when an environmental measure is incorrect or missing, selecting this voice the calculation will proceed using the configured predefined value from the association of calculated quantities and measures file (§5.6.2); if you do not select this option the data with the incorrect value will be automatically excluded from the calculation; use this option if a sensor is missing (e.g.: in the calculations of thermal dissatisfaction indices you are interested only in the measure of the floor temperature, while measures are not taken at 10 cm.)

5.9.1.3. Moderate microclimate settings

The *Moderate settings* window in the *Program Settings* shows the available options and the list of limits set for the different acquired and calculated quantities; it also indicate the abbreviations of the measures used by the program.

Use the formulas contained in the UNI ISO 7730 is the sole modifiable option influencing the radiant asymmetry calculations: if not selected, the program will use the polynomial interpolation formula directly from Fanger graphs, otherwise the interpolation formula reported in the regulation (§4.1.1.2.).

5.9.1.4. Hot microclimate settings

Hot PHS settings form in the *Program Settings* window shows the list of the limits related to the different calculated and acquired quantities. It also shows the abbreviations for the measures used in the program.

5.9.1.5. Cold microclimate settings

The *Cold settings* window in the *Program Settings* shows the available options and the list of limits set for the different acquired and calculated quantities; it also indicate the abbreviations of the measures used by the program.

5.9.2. Calculations characteristics

You can make a calculation for each measure point containing at least one or more selections of environmental data or user defined data and one or more subject parameters, according to the requested type of calculation.

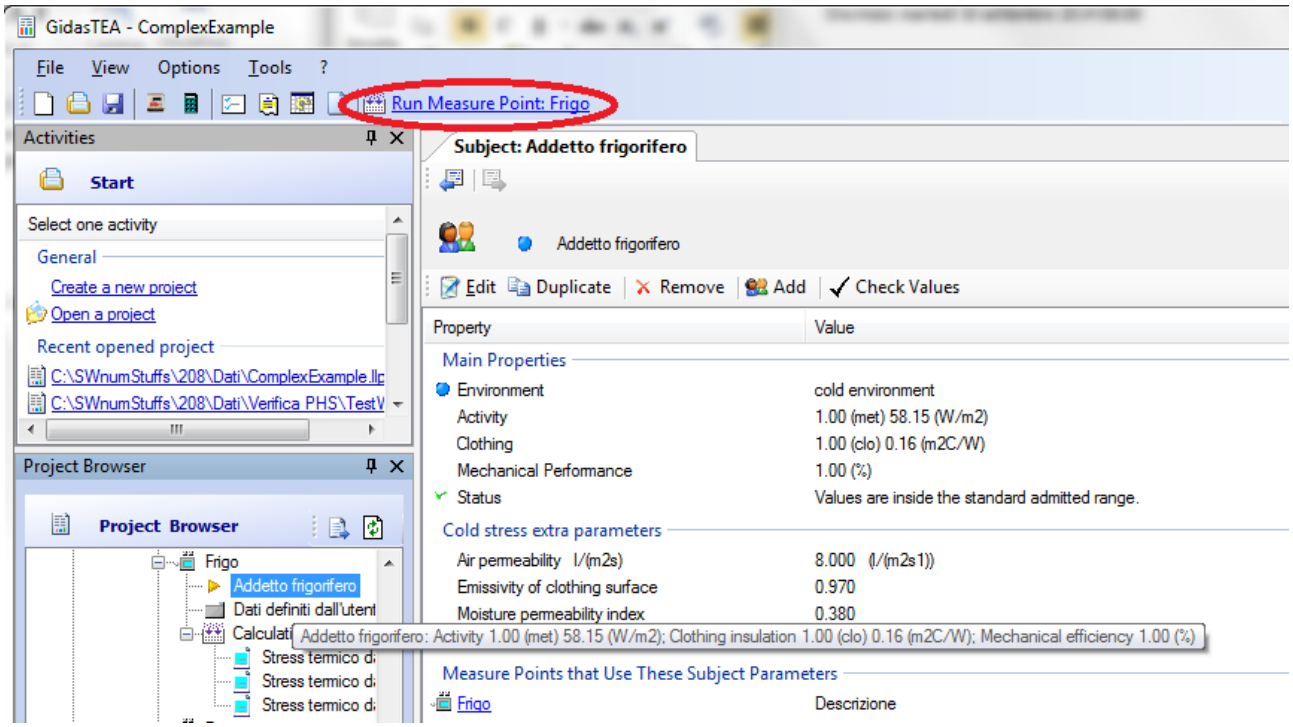
While *Subject Parameters* are defined on a project level, in a way that the same *Subject* can be used for different *Measure Points* without having to re-import it, the selections of data are related to the single *Measure Points.*

Every *Measure Point* can carry more *Subjects* or more selection of data so it is possible to make more calculations at the same time, combining the different *Subjects* with the different data.

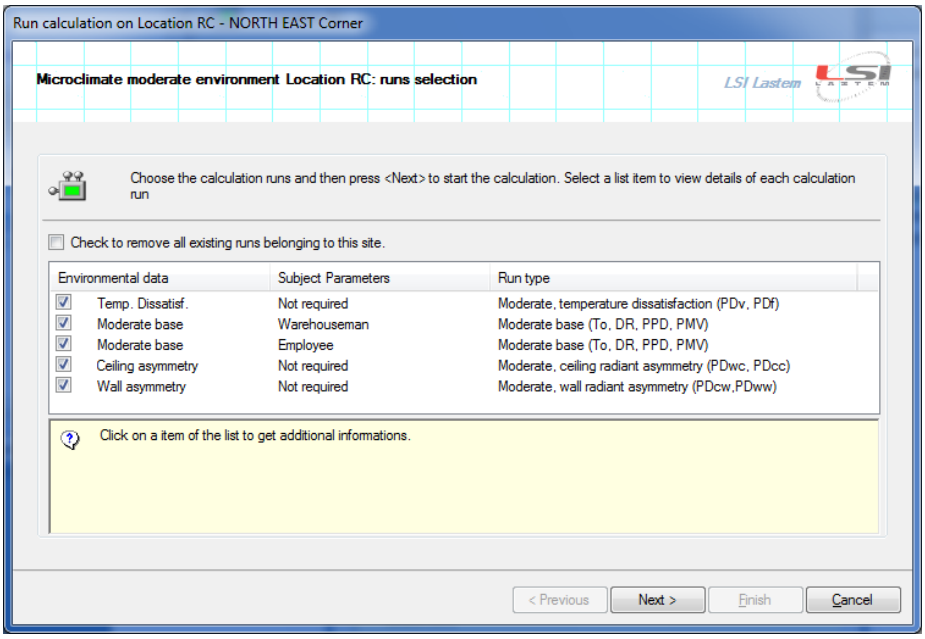
NOTE
Each calculation is saved in Measure Point in the Calculation Results section and it can be open also if its generating elements are deleted of modified; this means that the calculation results store the entry data so that if the modification of the run Subject does not effect the calculation just made but only the future ones and the and the calculation check show the original Subject values used for the calculation.

5.9.3. Making calculations

For calculation select a *Measure Point* or an element of a *Measure Point* from the *Project Browser* and then select the *Run* button on the toolbar or the contextual menu of the *Measure Point* or the *Run* button on the Properties window.

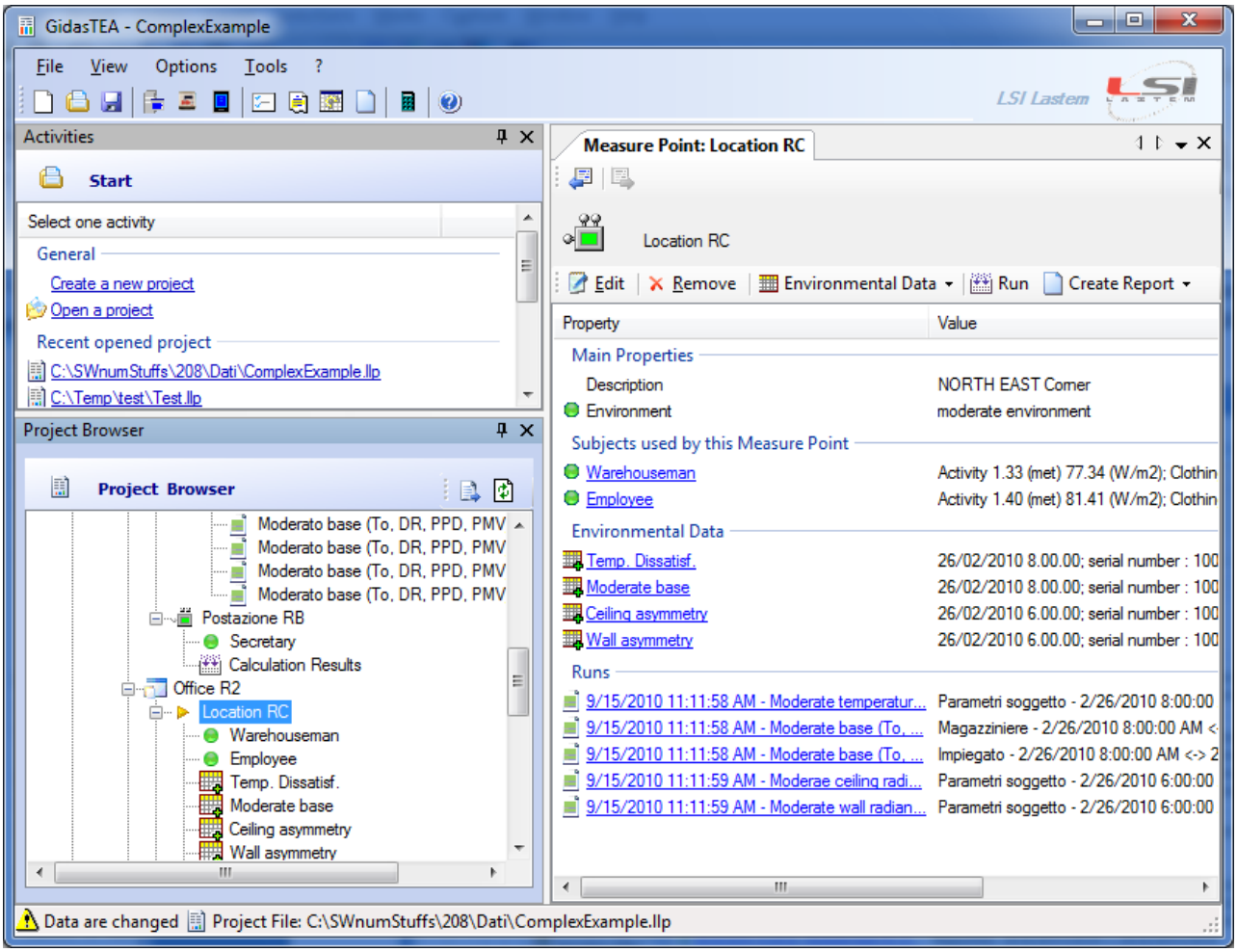


The wizard procedure for the calculation allows to choose the calculation to be made among those available, according to the combinations between subjects and environmental data or user defined data of the measure point.



In this case the selected measure point is a moderate environment with two subjects (*Employee* and *Warehouseman*) and five environmental data sets. As you can see the *Moderate base* calculation is proposed for both available subjects.

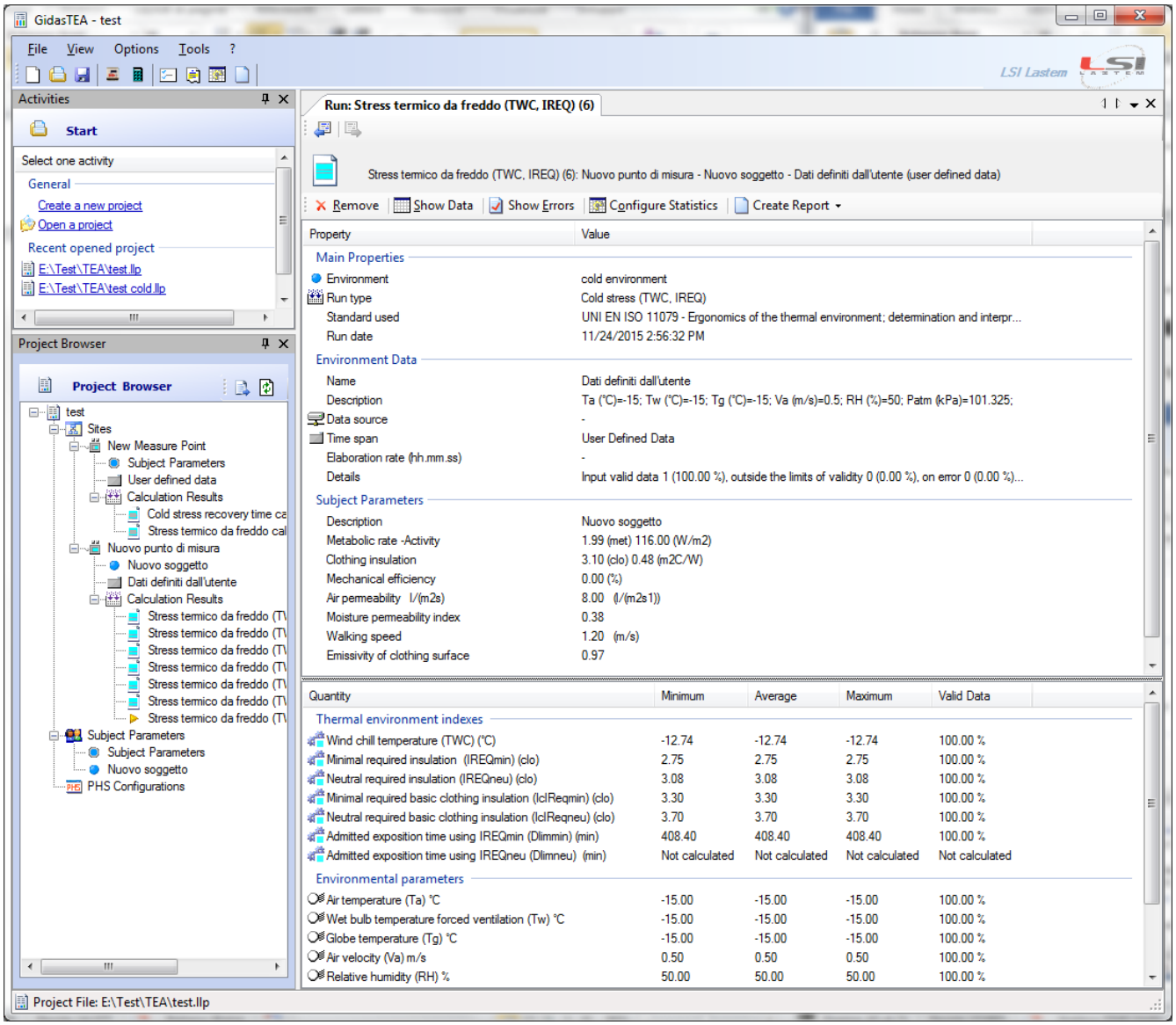
Selecting the *Check to remove all existing runs belonging to this site* checkbox you delete all the calculations already made on this measure point (not the environmental data present in the database). Otherwise the calculations will be added to the already made permitting the confrontation.



This window shows the measure point properties (Location *RC*) after few calculations, shown in the *Runs* list.

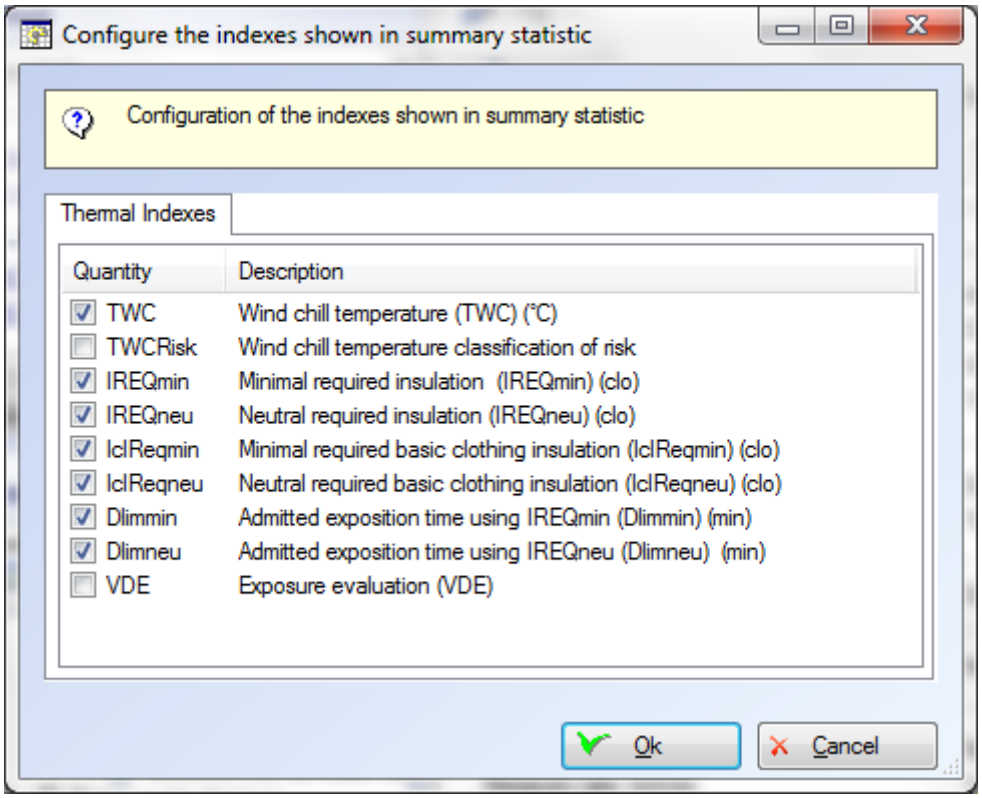
5.10. Viewing the calculation results

Select a calculation in the project browser to open the calculation properties window:



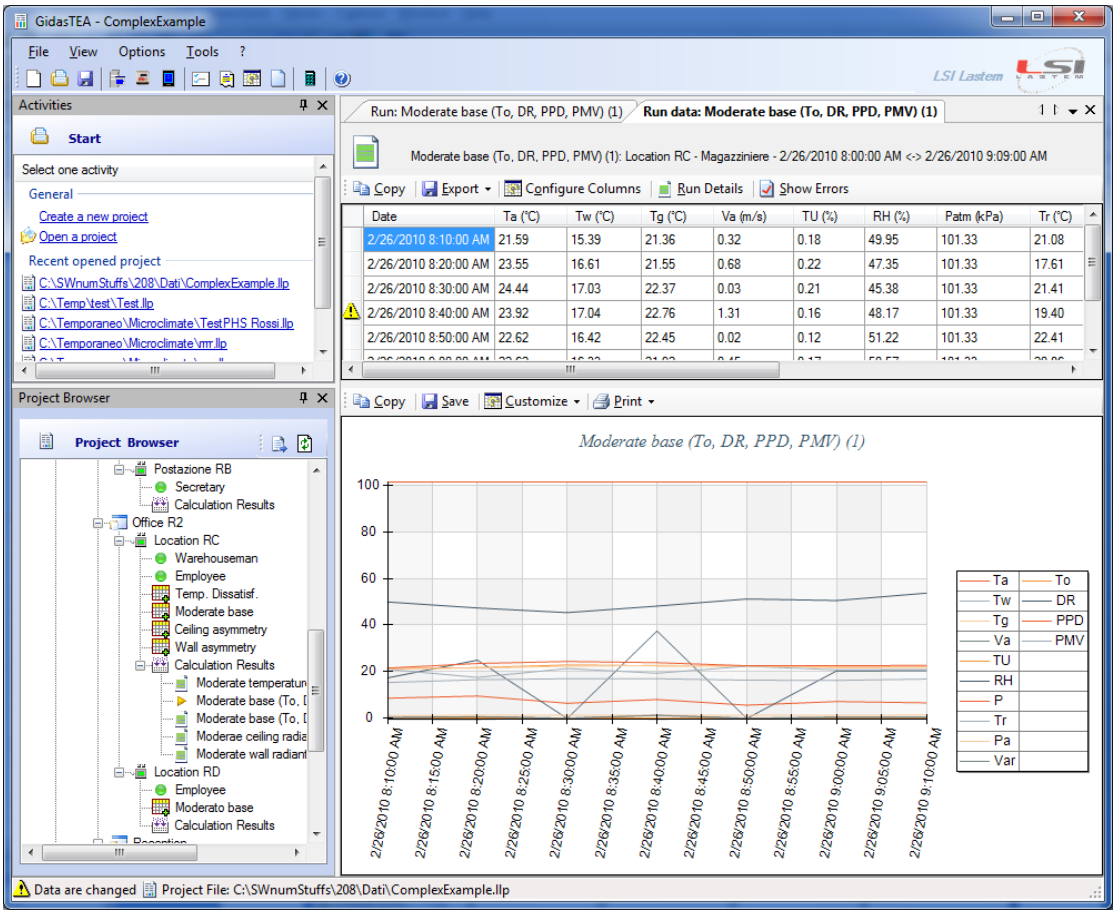
In the upper section of the window you find the data used for the calculation, in the lower section the statistic results (Minimum, Average, Maximum and the percentage of Valid data used in the calculation) of the calculated indices and the principle environmental variables used.

To delete a calculation select <*Remove*> button; to view data select *Show Data* button; to view the errors select <*Show Errors*> button; to create the calculation report select <*Create Report*> button; to select indexes to display in the statistics select the <*Configure Statistics*> button showing the following window:



The errors view shows all errors occurred during the calculation.

The Data View window shows the table and the graph of environmental data and the calculated indices. The menu *Options* → *Data Table Format Settings* sets the format of the data table.



The  icon present one the line for calculated data shows that one of the reported environment data is exceeding the permitted values.

Selecting <*Configure Columns*> button you can select the quantities to view in the table or graph.

NOTE
The selection of the columns is valid for every kind of calculation similar to the running one; e.g. if the calculation is a moderate base type, all the calculations of moderate base will show only the selected values even if the program will calculate all of them anyway.
Select again <Configure Columns> button to go back to the complete view.

The available options on the table allow to:

- copy selected data on Windows (*clipboard*) memory from where can be pasted to all those applications supporting *copy and past* command;
- export the entire table on a text file or on *Microsoft Excel* (*OpenOffice* compatible*);* the menu *Options→ Export To Text File Settings* holds all the setting to format the data exportation on text file.

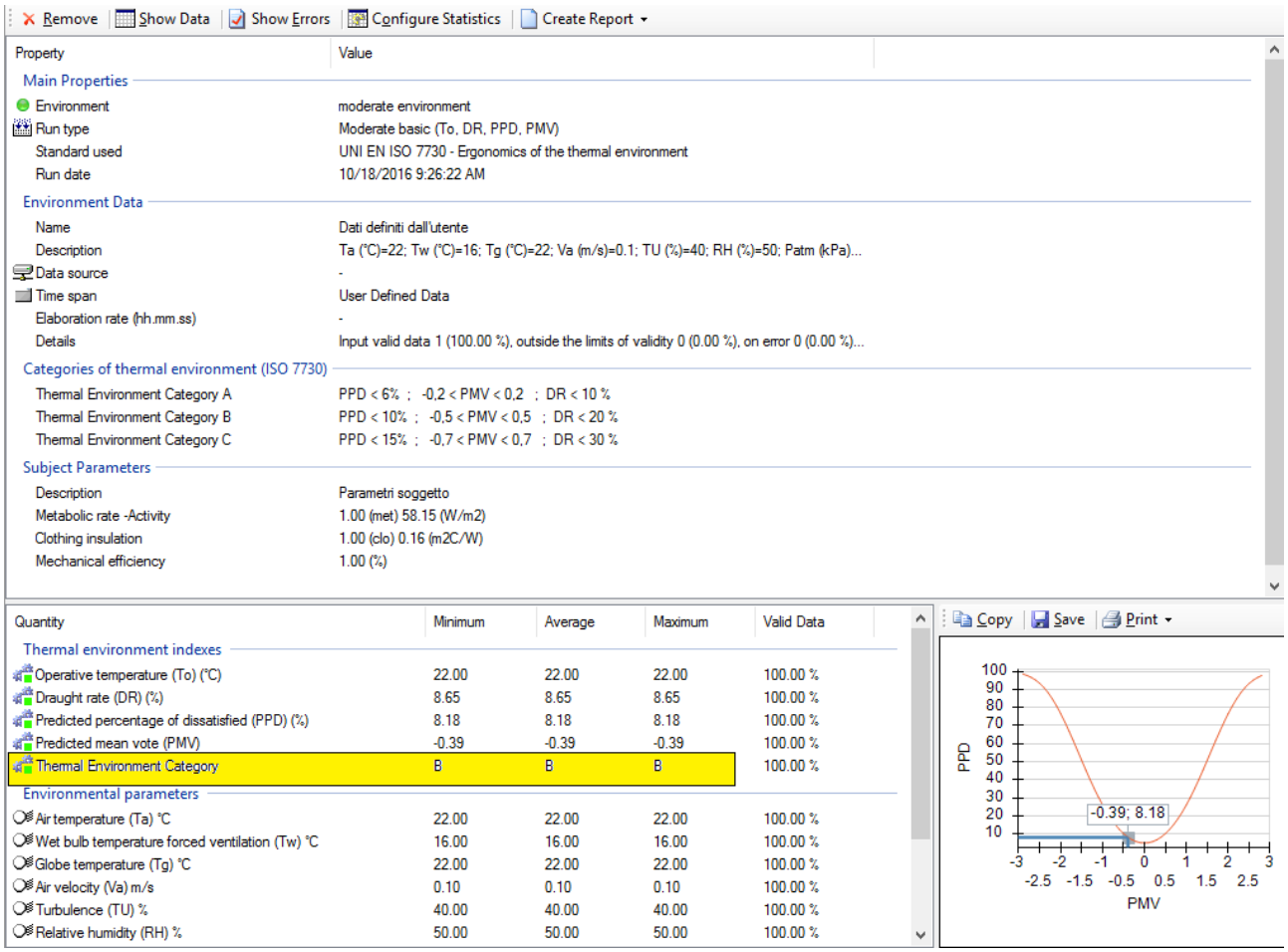
The graph options allow to

- copy, save as image file or print the graph;
- view or hide the legend, view or hide the cursor showing the data value where the mouse is pointing: these options are accessible pressing <*Options*> button.

NOTE
Microsoft Excel format is compatible with Excel versions starting from Office XP.

5.10.1. Moderate environment

In the base moderate calculation the value of the thermal environment Category is also displayed (A, B, C); contrary to what happens with all the other indices, the statistical value of the Category is not given by the various statistical categories obtained record by record but is evaluated on the statistical values of PMV and PPD: for example, the average value of Category is given by the category corresponding to the average values of PMV and PPD.



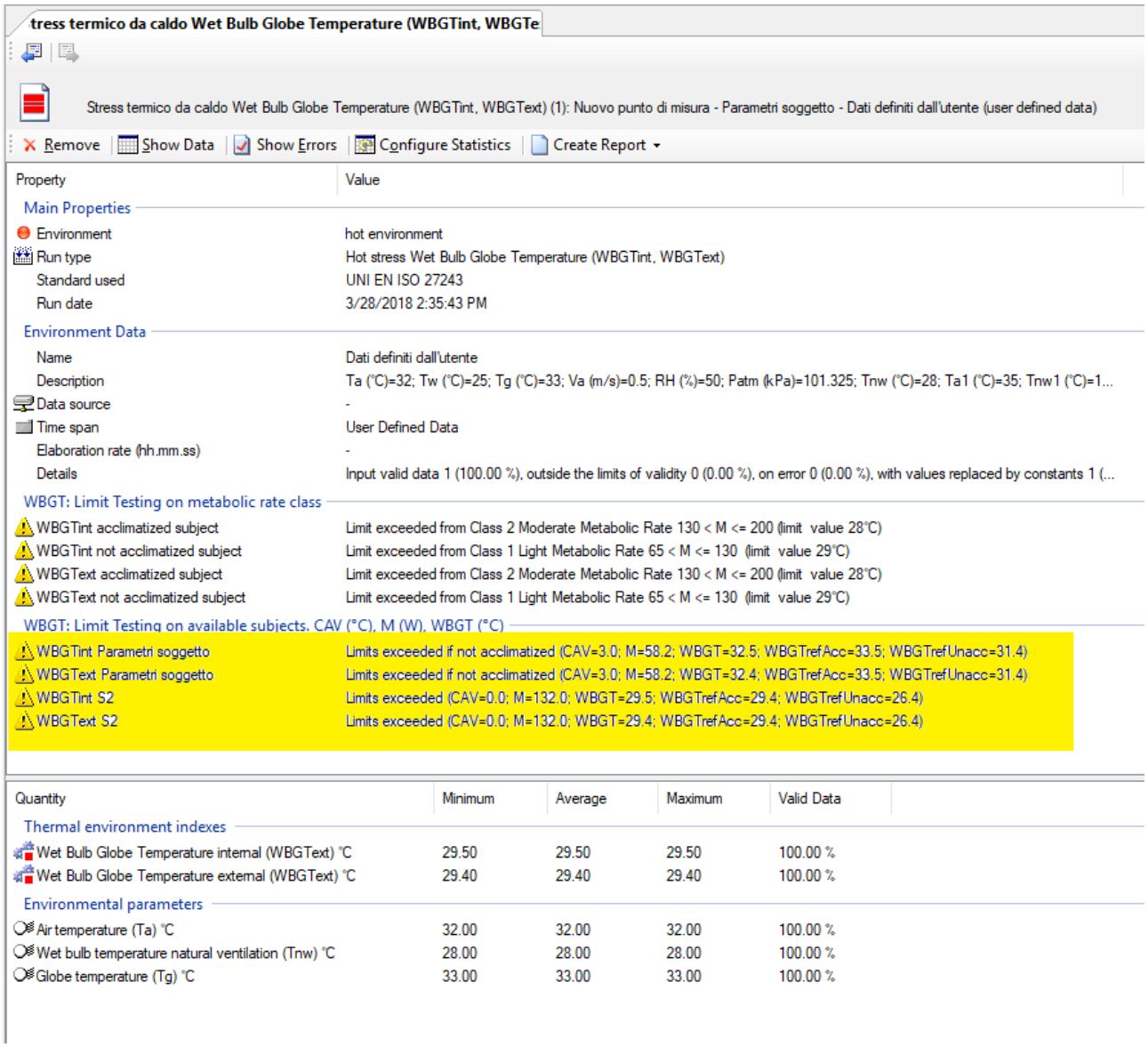
5.10.2. Cold environment

In the cold stress calculation the statistics do not show Dlim index (duration of exposure limit), TWCRisk (Wind Chill Temperature classification of risk) and VDE (evaluation of the thermal insulation of clothing) because it does not make sense to calculate a mean value for these indices, however, you can change the index list displayed by selecting the button <Configure Statistics>.

5.10.3. Hot environment (WBGT)

The WBGT indices are evaluated for both acclimatized and not acclimatized subjects. The evaluation is made on the average value of the estimated index over the whole period.

In the results of the calculation of the WBGT, program displays any overcomes of the indices with reference to Table A.1 of the standard (Metabolic rate class) for generic subject. If the measuring point contains specific subject parameters the program displays the overcomes of the WBGTeff (WBGT + CAV) for each subject, using the analytical formula provided in the Annex A of the standard based on the actual metabolic rate of each subject.



5.11. PHS index calculation

UNI EN ISO 7933: *Ergonomics of the thermal environment - Analytical determination and interpretation of heat stress using calculation of the predicted heat strain (PHS Predicted Heat Strain Model*)" in comparison with the previous standard, it modifies substantially the calculation for the evaluation of thermal stress in a severe hot environment.

The calculation described in the standard evaluates the evolution of two parameters, rectal temperature and the total loss of liquids, minute by minute in each site where the subject operates. That is why you need to follow the worker during his activity, including the resting times: the calculation will not be linked to a single measure point, but to an ordered sequence of measure points (including the measure points associated to resting locations) each one characterized by a set of subject parameters and a series of data describing, minute by minute, the environmental parameters flow.

To make the PHS Index calculation you need to:

- define the single measure point with the relative subject parameters and the environmental data; these measure points will be associated with hot or relax environments;

- create a new calculation configuration for PHS index including the sequence and the duration of the worker permanence in the measure point previously defined;
- making the calculation.

The standard for calculating the PHS was updated in 2023 and *GidasTEA* version 1.9 implements the changes.

All PHS calculations made starting from version 1.9 of the program use the new formulation as defined in the 2023 version of the standard.

The program is able to automatically distinguish new calculations from calculations made with previous versions of the standard.

The main changes to the calculation of the PHS compared to the previous version of the standard are the following:

- The maximum sweat rate *SWmax* described in B.4 has been corrected, i.e. it is no longer adjusted for metabolic rate. New limits are:
    - Unacclimatized subject: 400 g/h
    - Acclimatized subject: 500 g/h
- In the criteria used to determine the maximum exposure time, the criterion based on 50% of workers was eliminated, maintaining only the criterion based on 95% of workers (B.1)

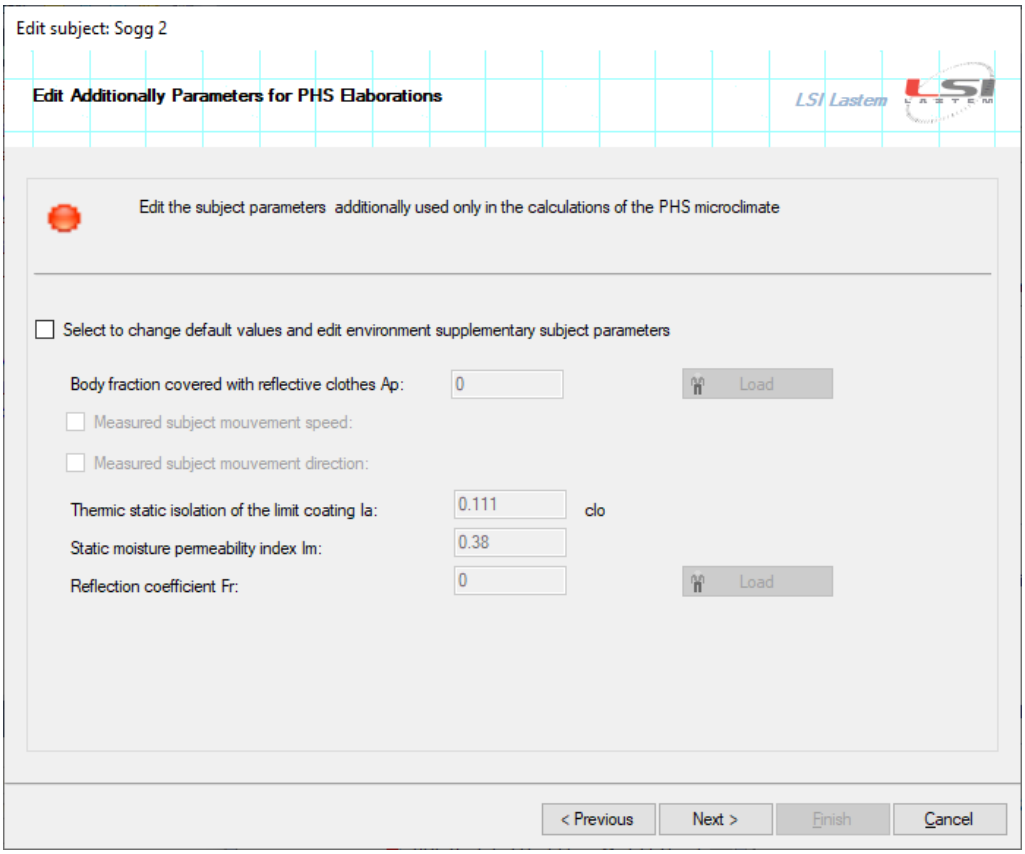
The calculation code implemented in *GidasTEA* was therefore updated by modifying the *SWmax* verification calculation and removing the calculation of time limits based on 50% of workers.

5.11.1. Adding a measure point

Adding a measure point for the PHS index calculation is identical to adding a measure point to the project (§6.4.1.); evidently when you refer to a measure point you need to specify if the environment is a hot or relax type.

5.11.2. Adding a subject to a measure point

The addition of a subject parameter is identical to what already previously described (§5.5.2) about adding a subject to a measure point; since the PHS index calculation requires few additional parameters compared to the other calculations described until now, the wizard procedure will show an additional screen view:



The <Load> buttons display respectively tables D.3 and D.2 of the 2023 version of the UNI ISO 7933 standard.

5.11.3. Adding a selection of environmental data to a measure point

The addition of a selection of environment data is identical to what already previously described (§6.6.3.) about adding a selection of environmental data to a measure point. The sole difference to consider is that the data used to calculate the PHS index must be available minute by minute therefore it is not possible to re-elaborate the environmental data on a personal rate, but it is always possible to use one average value for the period of time: in this way the average data is used for every minute of permanence of the subject in the measure point.

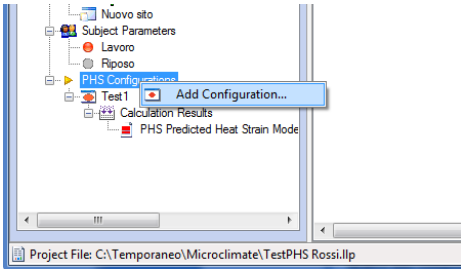
NOTE:
The standard instrument configuration for the calculation of PHS index carries also Tnw (Wet bulb temperature natural ventilation) measure used for the calculation of WBGT index: this measure is not used for PHS index calculation.

5.11.4. Adding a selection of user defined data to a measure point

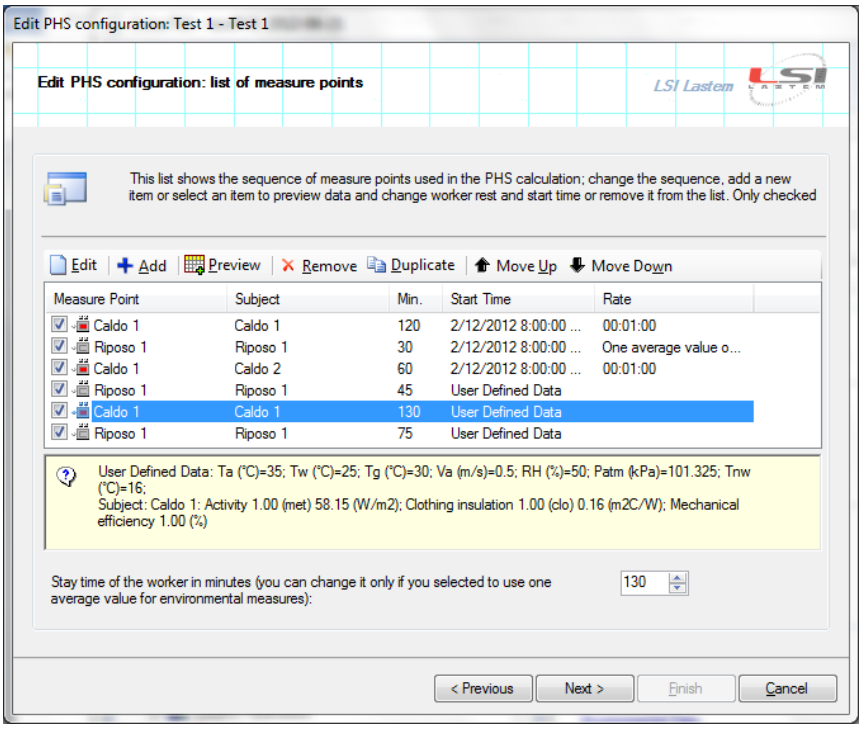
The addiction of a selection of user defined data is identical to what already previously described about adding a selection of environmental data to a measure point (§ **Errore. L'origine riferimento non è stata trovata.**); please note that in this case the only data record is used for every minute of permanence of the subject in the measure point.

5.11.5. Adding a new configuration

To add a new configuration for PHS index calculation select *PHS Configurations* knot from the project browser:



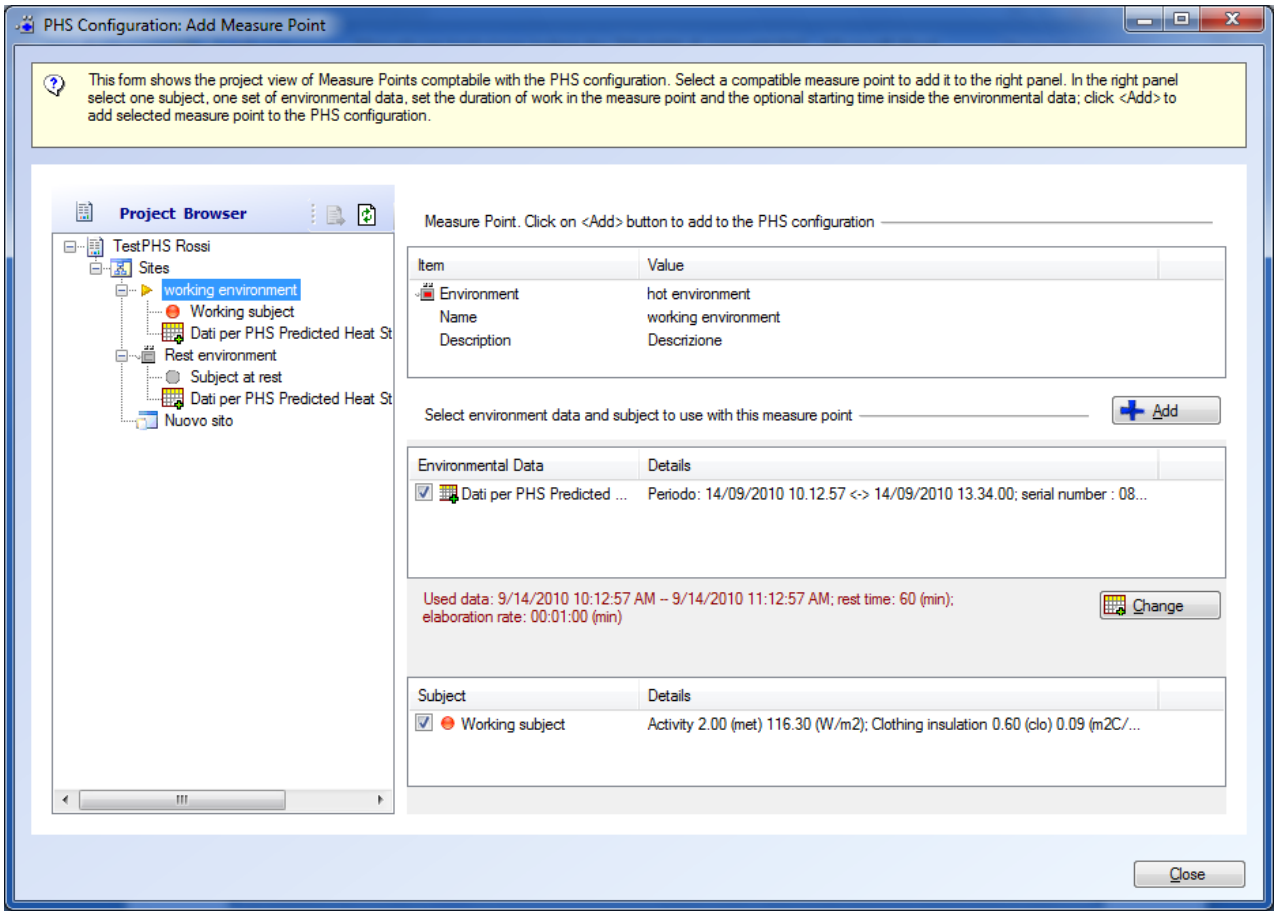
The wizard procedure for a new PHS configuration shows the screen view where to import the sequence of measure points and the worker permanence time in each of them:



In this window is possible to manage the sequence of measure points used in the PHS index calculation by adding, removing, duplicating or moving the selected measure point. It is also possible to modify the time of permanence in the selected measure point if within the time period of the associated data (it is possible to define the longest period of permanence of the associated data re-elaborating them so to use only one average value for the whole time of the subject permanence in the environment or using a set of user defined data).

NOTE
The available measure points are those included in the project: once you remove a measure point from the list it is NOT removed also from the project, where it remains available for eventual later use.

Clicking <*Add*> button the window to add a new measure point to the list is shown:

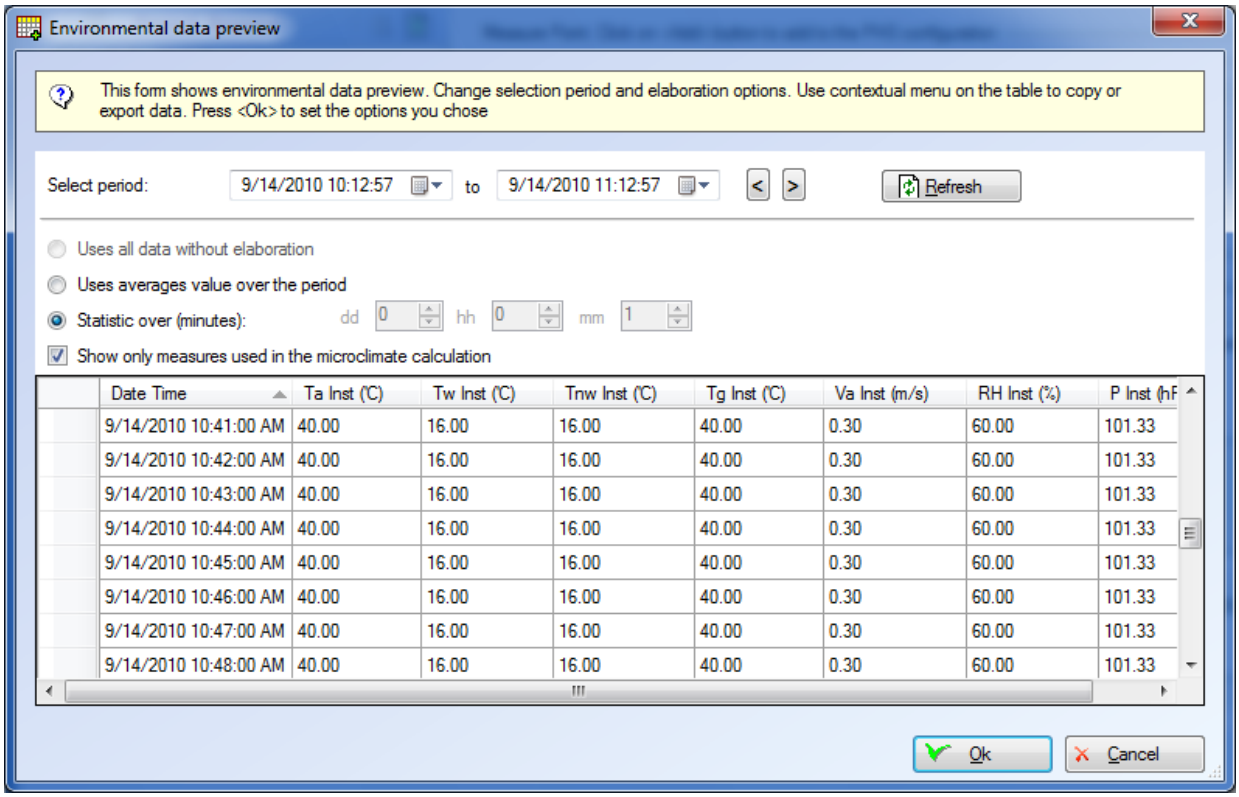


This window shows the run project only with the measure points compatible with the calculation of the PHS index (measure point for hot or rest environments). To add a measure point to the list you need to:

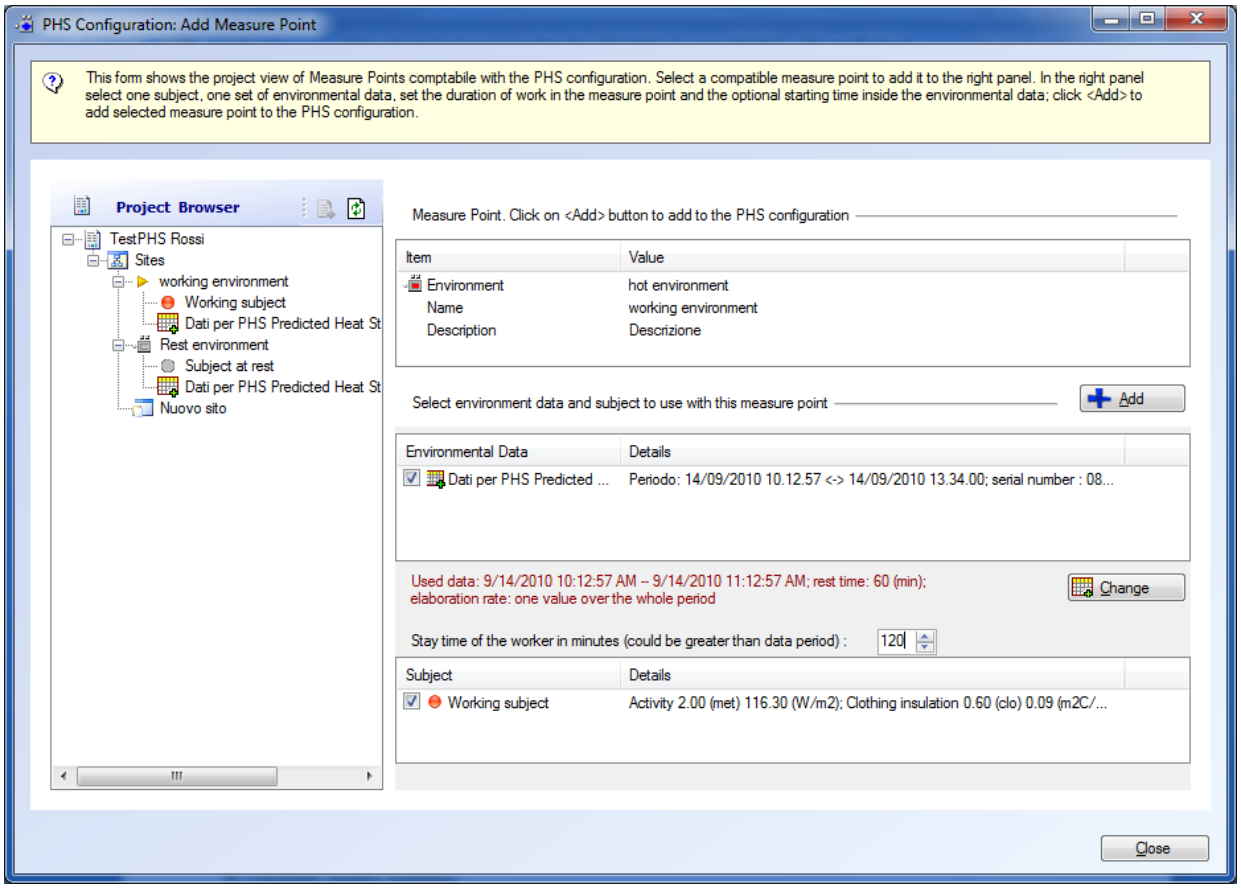
- select the measure point from the project browser in the left panel; the selected measure point is view in right panel of the window;
- select the subject parameter and the environmental data set needed for the calculation if the measure point carries more than one subject parameter and more than one set of environmental data or user defined data;
- selecting the environmental data is set the permanence of the subject in the measure point: initially it is set on 60 minutes value: to modify this value and the export time of the data within the selected set, click the <*Change*> button; If you select a set of user defined data the <*Change*> button is disabled and you can set the time of permanence in the environment of the subject;
- click the <*Add*> button to add the configured measure point to the list of the measure points.

NOTE
Opposite to the moderate microclimate calculations and the WGBT, the calculation of PHS index requires the elaboration of the environmental data minute by minute; that program allows also the use of only one average value for the whole period that will be considered as fix data for every minute of permanence of the subject in the measure point.

The data settings window shows the preview of selected data and allows you to specify the eventual subnet from which import the data:



Using the data elaborate minute by minute, the length of the subject permanence in the measure point is determined by the time break of the data; if you decide to use only one average value over the whole time period (selecting the *Uses averages value over the period*" checkbox) you can specify a longer period of permanence. Back to the window you will see "*Stay time of the worker in minutes*":



Consider the following example:
the subject stays in the measure point for 4 hours but the data are recorded only for 20 minutes. The only chance to make the calculation is to use only one average value (evaluated during the 20 minutes period when the measurements were taken) and manually specify a stay time of 240 minutes.

5.11.6. Making the index calculation

Select the chosen PHS configuration to make the calculation and use the contextual menu *Run* or a similar button in the properties window.

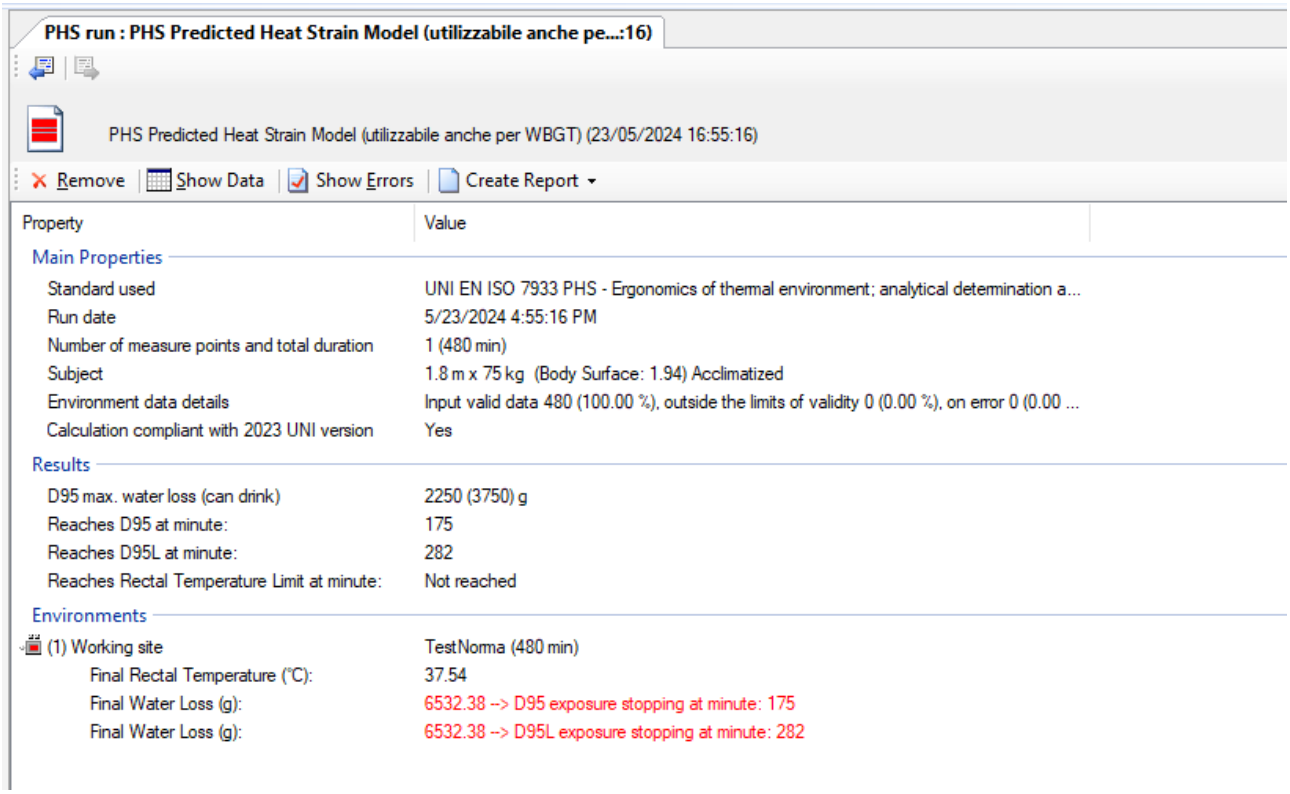
In the wizard procedure for the calculation you can set height, weight and acclimatization state of the subject.

NOTE
Each calculation is saved in the PHS configuration in the Calculation Result panel and it is accessible even if the generating elements are removed. This means that the result of the calculation carries the entry data that modifying the subject used for the calculation this will not reflect on the calculation just made but only on the future ones, and the calculation test just made show the original values of the subject used for the calculation.

NOTE
Contrary to the calculations of other microclimatic indices, when a data record is mistaken the calculation stops because it is a sequential calculation and it is performed on a minute-by-minute basis.

5.11.7. Viewing the calculation results

Selecting a calculation in the project browser, the *Calculation Properties* window will be open in the *Calculation Results* file of PHS configuration:

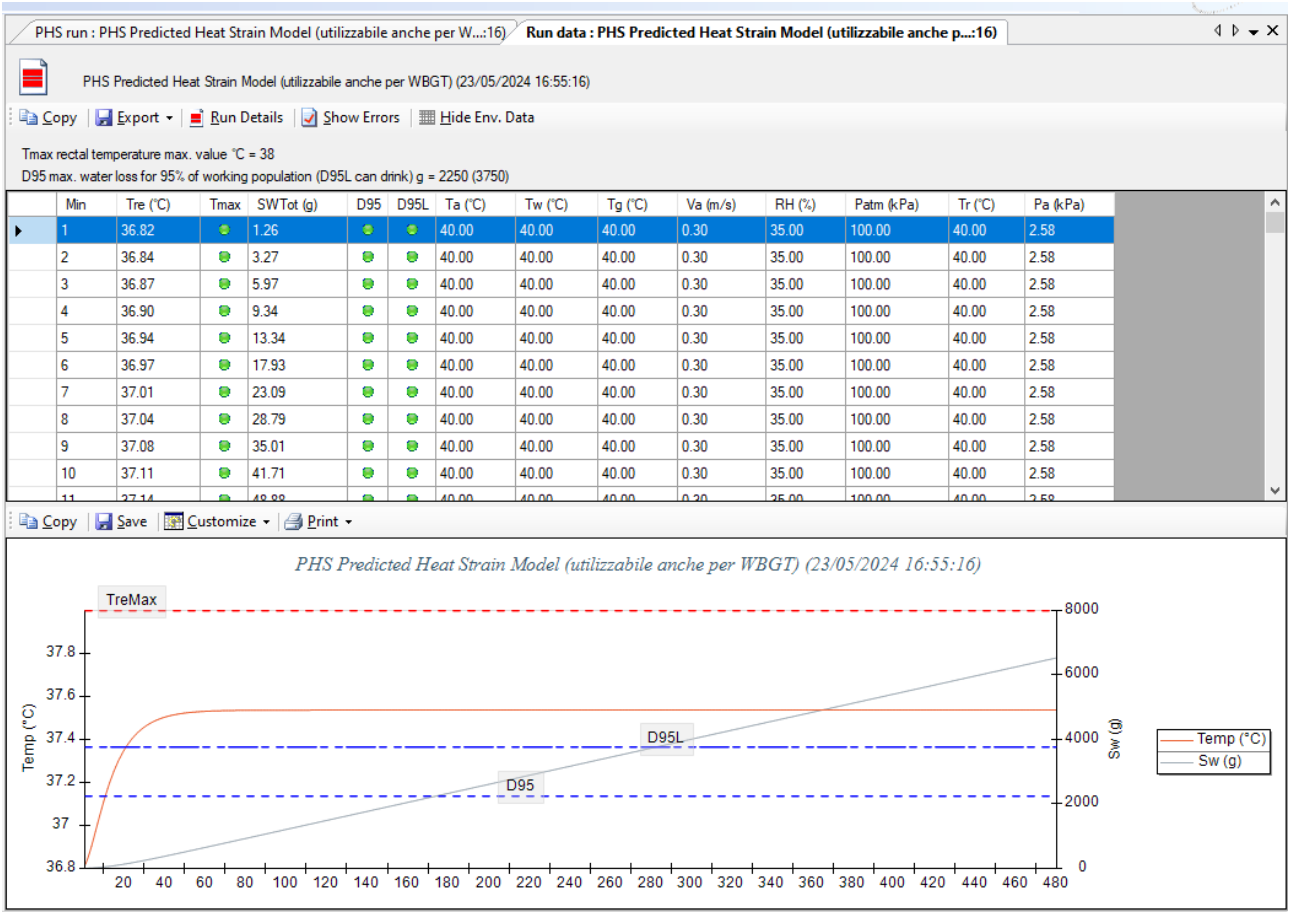


This window views the calculations results in a synthetic way besides the synthetic data of all the measure points in the list with the duration of the worker stay in each of them.

Select the <R*emove*> button to remove the calculation; to view the data select <*Show Data*> button; to view the errors select the <*Show Errors*> button and to create a report of the calculation select <*Create Report*>.

The view of the errors shows all the errors verified during the calculation.

The *Show data view* window shows tables and graphs of the environmental data and the calculated indices. The menu *Options* → *Data Table Format S*ettings sets the format of the data table.



The  icon is present when an environmental data exceeds the limits of the permitted values.

NOTE
If the environmental data on a minute-by-minute basis are taken from only one average data over the period (therefore they are all the same) the eventual notification of an exceeding data is reported on the first minute of permanence in the environment.

The table and the graph both indicate on a different background the passage from an environment to another one.

Selecting the <*Show [Hide] Env. Data*> button you can decide to add or not also the environmental data used for the calculation to the table.

The options available on the table allow:

- to copy the selected data in the Windows memory (*clipboard*) from where they can be pasted to all the applications supporting the *copy and paste* command.
- to export the complete table on Text File or Microsoft Excel (OpenOffice compatible); the menu *Options* → *Export To Text File Settings* carries the setting to format the exportations of data on text file.

The options available on the graph allow:

- to copy, save as picture file or print the graph;
- to show or hide the legend, showing or hiding the browser that views the data values in the point indicated by the mouse: these options are accessible with the <*Options* > button.

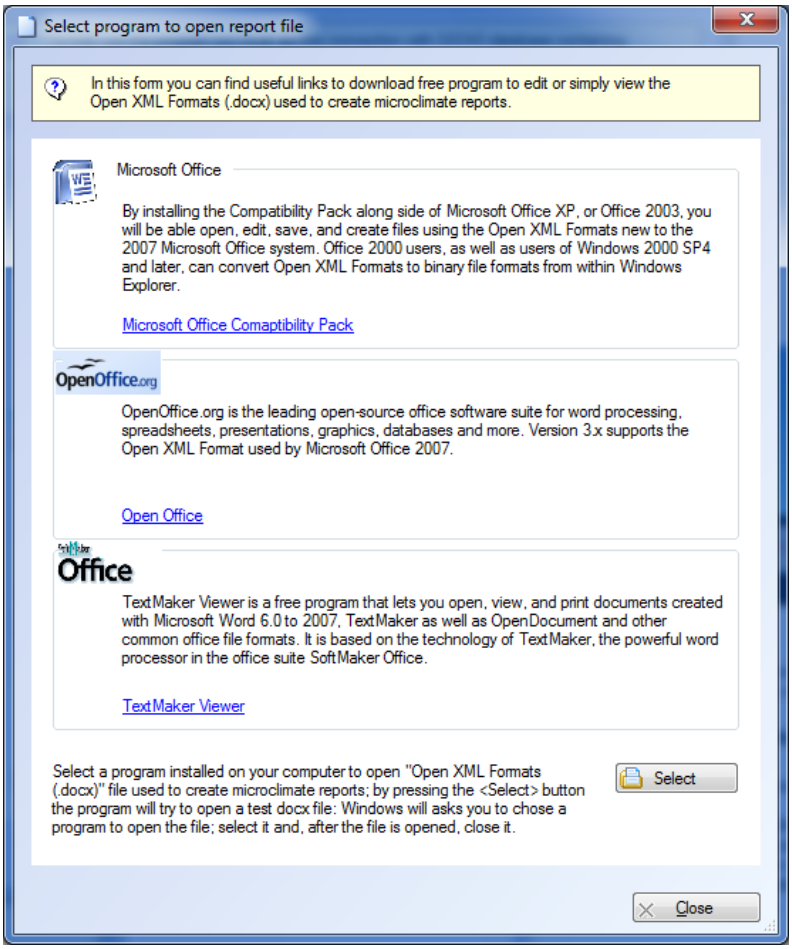
NOTE
Microsoft Excel format is compatible with Excel version starting from Office XP.

5.12. The report

Selecting a calculation in the project browser, the calculations properties window will open; selecting the <*Create Report*> button you can generate a report of the single calculations.
Selecting the *Measure Point* in the project browser, the Measure Point Properties will open; selecting the <*Create Report*> button you can generate a report containing all the calculations present in the measure point.

5.12.1. Templates configuration and management

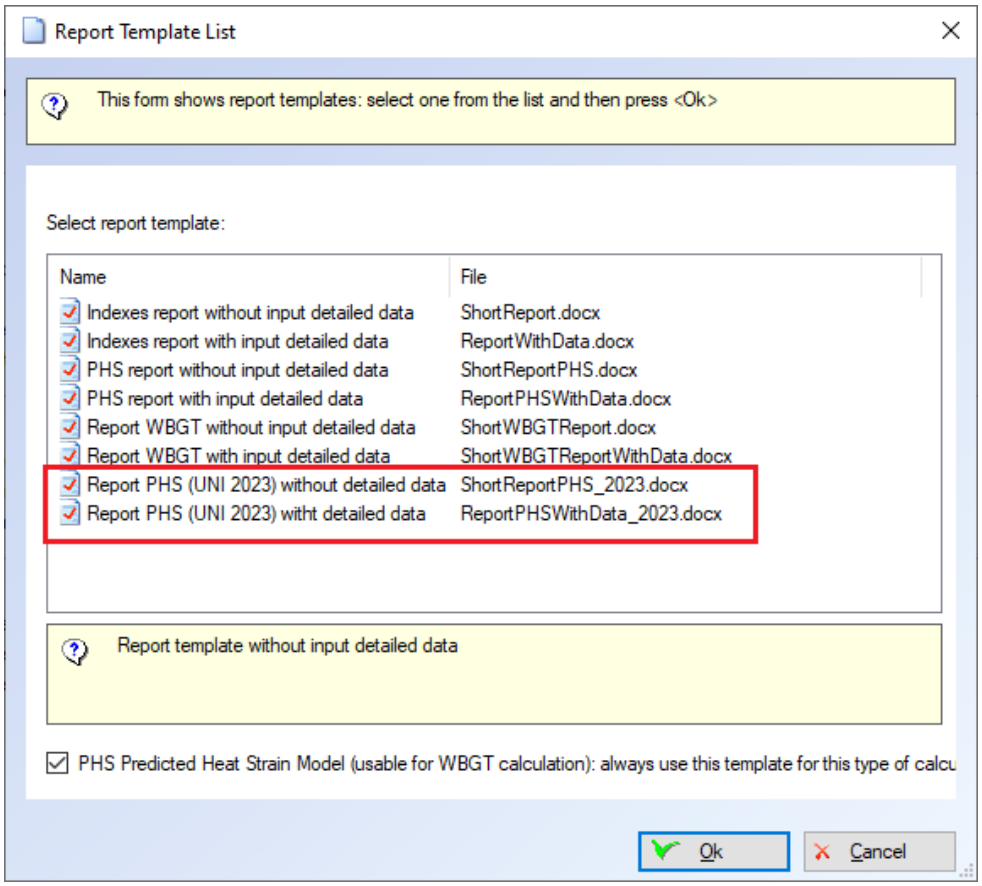
Choose *Options* → *Report Setting* to open the report configuration window.
The *General* chart views the pre-defined program associated in the computer *to Office Open XML (docx* file). If an associated program don't exist click the <*Select*> button to open the select program window:



This window offers few options:

- choose one of solutions or install a program able to manage *docx*.file;
- Press *Select* to associate a program already installed in the computer to *docx*.file.

The *Templates* chart views the list of available reports:



The templates indicated with the icon are those installed with the program cannot be modified. With the installation of version 1.9 of the program, two new reports are installed (*ShortReportPHS_2023.docx* and *ReportPHSWithData_2023.docx*) which are automatically associated with the new PHS calculations as modified by the 2023 version of the standard. Previous calculations remain associated with previous models.

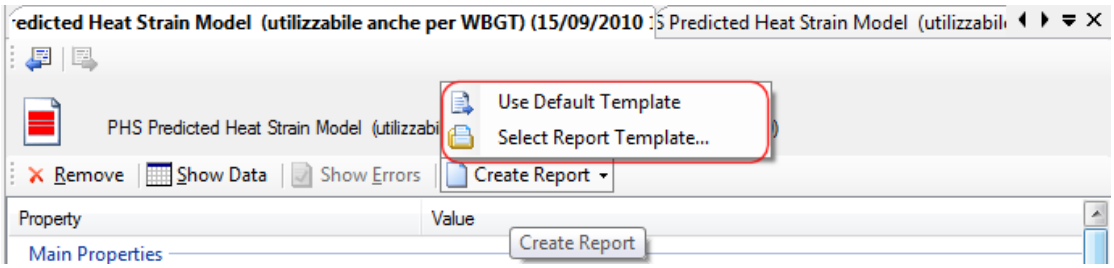
Select an element from the list and click:

- *Remove*: to remove the element permanently;
- *Edit:* to edit the file with *docx* extension associated with the template to modify it; if you select this option on one of the templates installed with the program, a new template is duplicated from the selected one;
- *Add*: to add a new template that will be generated from the selected one.

Quando si seleziona il pulsante <*Crea Rapporto*> su un punto di misura o su un singolo calcolo è possibile scegliere se utilizzare il modello predefinito o sceglierne un altro:

The <*Default*> button allows choosing a template and considering it as preset since it is possible to create both the report of a single calculation and the report of a measure point carrying more calculations. You can associate a predefined template to calculations type or to an environment.

When you select the <*Create Report*> button on a measure point or on a single calculation it is possible to choose a predefined template or a different one.



5.12.2. Creating a template

A report model is a file *.docx* holding some *markers (keys)* that will be substituted by those values present in the calculations.

The model defined by the user are saved in the folder:

`C:\ProgramData\LSI-Lastem\GidasTEA\UserTemplate (in Windows 7)`

`C:\Documents and Settings\All Users\Data Applications\ LSI-Lastem\GidasTEA\UserTemplate (in Windows XP)`

Le chiavi che identificano gli elementi sono racchiuse tra parentesi graffe; questa è la lista delle chiavi riconosciute dal programma:

The user can modify existing models or create a new one; in this case you need to create a new file *.docx* and import the various keys that will be substituted by the information carried in the calculation the moment the report is generated.

The keys identifying the elements are enclosed in braces. Here you find a list of the keys most recognized by the program.

Key	Meaning
General	
{Software}	Software for calculation, name and version
{ReportDate}	Creation date of the report
Measure Point	
{MeasurePointDescription}	Description of the Measure Point
Calculation	
{Run.Name}	Name associated to the calculation
{Run.Date}	Issuing date of the report
{Run.Type}	Type of the Calculation
{Run.Desc}	Description of the calculation
{Run.StandardUsed}	Reference standard used
{Run.FactoryMatr}	Instrument Serial Number originating the environmental data
{Run.TimeSpan}	Data Time span
{Run.ElaborationRate}	Elaboration rate
{Run.InstDetails}	Percentage of the environmental data: valid, error, exceeding
{Run.InstDescription}	Data Description
{Run.SpDescription}	Subject Description

{Run.PsicroStd}	Psychrometric standards
{Run.PsicroK}	Psychrometric constant
{Run.VDELegend}	Cold microclimate: inserts the legend to interpret the index VDE
{Run.TWCLegend}	Cold microclimate: inserts the legend to interpret the index TWCRisk
{Parameters.Key}	Keys generating the subject parameters table; Name of the single parameter as key solution
{Parameters.Value}	
{EnvIndex.Key}	Keys generating the environmental data statistics; Quantities Names as key solution.
{EnvIndex.Min}	
{EnvIndex.Ave}	
{EnvIndex.Max}	
{ThermIndex.Key}	Keys generating the statistics table of the calculated indices Quantities Names as key solution.
{ThermIndex.Min}	
{ThermIndex.Ave}	
{ThermIndex.Max}	
{WBGTLimits.Key}	Keys generating the limits evaluation table of the WBGT index with respect to metabolic classes.
{WBGTLimits.Value}	

5.12.2.1. Inserting of subject parameter tables, of environmental measures and calculated indices

To generate a table, insert the first line with specific keys. Example:

Quantity	Minimum Value	Average value	Maximum value
{EnvIndex.Key}	{EnvIndex.Min}	{EnvIndex.Ave}	{EnvIndex.Max}

The report result will appear as follows:

Quantity	Minimum value	Average value	Maximum value
Air Temperature (Ta) °C	21,59	23,07	24,44
Wet bulb temperature at forced ventilation(Tw) °C	15,39	16,53	17,04
Globe temperature (Tg) °C	21,36	22,07	22,76
Air velocity (Va) m/s	0,02	0,47	1,31
Turbulence(TU) %	0,12	0,17	0,22
Relative Humidity (RH) %	45,38	49,48	53,73
Atmospheric pressure (P) kPa	101,32	101,32	101,32
Average radiation temperature (Tr) °C	17,61	20,53	22,41
Partial pressure of water vapor in air (Pa) kPa	1,29	1,40	1,49
Relative air velocity (Var) m/s	0,02	0,47	1,31

WARNING
Only the selected values in the run view will be shown (those selected in the Data calculation window), press the <Configure Columns> button (§5.10).

5.12.2.2. Loading data tables

To load the data tables the following keys will be needed:

Key	Meaning

Moderate Base	
{Data.DD}	Date
{Data.Ta}	Air Temperature
{Data.Tw}	Wet bulb temperature forced ventilation(Tw) °C
{Data.Tg}	Globe temperature
{Data.Va}	Air velocity (Va) m/s
{Data.RH}	Relative Humidity (RH) %
{Data.P}	Atmospheric pressure
{Data.TU}	Turbulence(TU)
{Data.Tr}	Average radiation temperature (Tr)
{Data.Pa}	Partial pressure of water vapour in air (Pa) kPa
{Data.Var}	Relative air velocity
{Data.To}	Operating temperature
{Data.DR}	Drift Ratio
{Data.PMV}	Predicted mean vote
{Data.PPD}	Predicted percentage of Dissatisfied people
{Data.Category}	Thermal evnironment category
Moderate, temperature dissatisfaction	
{Data.DD}	Date
{Data.Ta}	Air Temperature
{Data.Ta10}	Temperature at 10 cm
{Data.DTv}	Difference Ta – Ta10
{Data.Tf}	Floor temperature
{Data.PDv}	Percentage Dissatisfied due to Vertical Temperature
{Data.PDf}	Percentage Dissatisfied due to Floor temperature

Moderate radiant asymmetry	
{Data.DD}	Date
{Data.DTprc}	Ceiling radiant asymmetry
{Data.DTprw}	Floor radiant asymmetry
{Data.PDwc}	Dissatisfaction percentage (radiant asymmetry, hot ceiling)
{Data.PDcc}	Dissatisfaction percentage (radiant asymmetry, cold ceiling)
{Data.PDww}	Dissatisfaction percentage (radiant asymmetry, hot wall)
{Data.PDcw}	Dissatisfaction percentage (radiant asymmetry, cold wall)
Hot Wet Bulb Globe Temperature	
{Data.DD}	Data
{Data.Ta}	Air Temperature
{Data.Tg}	Globe temperature
{Data.Tnw}	Wet Bulb at Natural Ventilation Temperature
{Data.WBGText}	Exterior Wet Bulb Globe Temperature
{Data.WBGTint}	Interior Wet Bulb Globe Temperature
Hot Wet Bulb Globe Temperature three levels	
{Data.DD}	Data
{Data.Ta1}	Air Temperature (ankles)
{Data.Tg1}	Globe temperature (ankles)
{Data.Tnw1}	Wet Bulb at Natural Ventilation Temperature (ankles)
{Data.Ta}	Air Temperature (abdomen)
{Data.Tg}	Globe temperature (abdomen)
{Data.Tnw}	Wet Bulb at Natural Ventilation Temperature (abdomen)
{Data.Ta2}	Air Temperature (head)
{Data.Tg2}	Globe temperature (head)

{Data.Tnw2}	Wet Bulb at Natural Ventilation Temperature (head)
{Data.WBGText}	Exterior Wet Bulb Globe Temperature
{Data.WBGTint}	Interior Wet Bulb Globe Temperature
Cold stress IREQ	
{Data.DD}	Date
{Data.Ta}	Air Temperature
{Data.Va}	Air velocity (Va) m/s
{Data.RH}	Relative Humidity (RH) %
{Data.Tr}	Average radiation temperature (Tr)
{Data.IREQmin}	Minimal clothing insulation
{Data.IREQneu}	Neutral clothing insulation
{Data.IclReqmin}	Minimal required clothing insulation
{Data.IclReqneu}	Neutral required clothing insulation
{Data.Iclr}	Real clothing insulation
{Data.Dlimmin}	Minimal duration limited exposure
{Data.Dlimneu}	Neutral duration limited exposure
{Data.VDE}	Clothing insulation evaluation
{Data.TWC}	Wind chill temperature
{Data.TWCRisk}	Wind chill temperature risk evaluation
Cold stress recovery time Drec	
{Data.DD}	Data
{Data.Ta}	Air Temperature
{Data.Va}	Air velocity (Va) m/s
{Data.RH}	Relative Humidity (RH) %
{Data.Tr}	Average radiation temperature (Tr)
{Data.Drec}	Recovery time

Example:

Data	DTprc (°C)	PDwc (%)	PDcc (%)
{Data.DD}	{Data.DTprc}	{Data.PDwc}	{Data.PDcc}

Report result (ceiling radiant asymmetry):

Data	DTprc (°C)	PDwc (%)	PDcc (%)
26/02/2010 6.00.00	0,42	0,42	N.C.
26/02/2010 6.01.00	0,44	0,43	N.C.
26/02/2010 6.02.00	0,44	0,43	N.C.
26/02/2010 6.03.00	0,45	0,45	N.C.
26/02/2010 6.04.00	0,42	0,41	N.C.
26/02/2010 6.05.00	0,39	0,39	N.C.
26/02/2010 6.06.00	0,42	0,41	N.C.
26/02/2010 6.07.00	0,42	0,42	N.C.

WARNING
Contrary to the summarizing statistic tables showing the same parameters chosen in the program view, the data tables always view only the data columns configured in the model, even if few of them have been hidden in the program.

5.12.2.3. Report specific keys for WBGT index calculation

Table overcomes WBGT

Key	Meaning
{WBGTLimits.Key} {WBGTLimits.Values}	Keys used to generate the table of exceedances for general subjects
{WBGTSubjLimits.Keys} {WBGTSubjLimitis.Values}	Keys used to generate the table of exceedances for specific subjects

Example:

Generic subjects:

Parameter	Result
{WBGTLimits.Key}	{WBGTLimits.Value}

Specific subjects:

Parameter	Result
{WBGTSubjLimits.Key}	{WBGTSubgjLimits.Value}

5.12.2.4. Report specific keys for PHS index calculation

General data table:

Key	Meaning
{Env.Min}	Keys used to generate the environmental table for PHS report
{Env.Att}	
{Env.M}	
{Env.Icl}	
{Env.Eta}	
{Env.Pos}	
{Env.M}	
{Env.Icl}	
{Env.Eta}	
{Env.Pos}	
{Env.Ap}	
{Env.WS}	
{Env.Theta}	
{Env.Iast}	
{Env.Imst}	
{Env.Fr}	
{Env.TaMin}	Minimum, Average and Maximum Air Temperature
{Env.TaAve}	
{Env.TaMax}	
{Env.TrMin}	Minimum, Average and Maximum Radiating Air Temperature
{Env.TrAve}	
{Env.TrMax}	
{Env.VaMin}	Minimum, Average and Maximum Air velocity
{Env.VaAve}	
{Env.VaMax}	
{Env.PaMin}	Minimum, Average and Maximum Partial Vapour Pressure
{Env.PaAve}	
{Env.PaMax}	
{Run.D50Lim}	D50 Maximum water loss for 50% of Working Population, limit value
{Run.D50LLim}	D50 Maximum water loss for 50% of Working Population limit value (free liquid access)
{Run.D95Lim}	D50 Maximum water loss for 95% of Working Population

	limit value
{Run.D95LLim}	D50 Maximum water loss for 95% of Working Population limit value (free liquid access)
{Run.TreLim}	Rectal temperature, limit value
{Run.D50}	D50 Maximum water loss for 50% of Working Population
{Run.D50L}	D50 Maximum water loss for 50% of Working Population, (free liquid access)
{Run.D95}	D50 D50 Maximum water loss for 95% of Working Population
{Run.D95L}	D50 Maximum water loss for 95% of Working Population limit value (free liquid access)
{Run.Tre}	Rectal temperature
{ERis.Name}	Environment name
{ERis.SW}	Total Water loss
{ERis.Tre}	Final Rectal Temperature

Complete data table:

Key	Meaning
{Data.Minute}	Calculation minute
{Data.TreB}	Final Rectal Temperature
{Data.SWTot}	Total water Loss
{Data.D50}	Exposure Duration limit for water loss in 50% of the population
{Data.D50L}	Exposure Duration limit for water loss in 50% of the population with liquid access
{Data.D95}	Exposure Duration limit for water loss in 95% of the population
{Data.D95L}	Exposure Duration limit for water loss in 95% of the population with liquid access
{Data.Ta}	Air temperature
{Data.Tr}	Average Radiating Temperature
{Data.Va}	Air Velocity
{Data.Pa}	Partial vapor pressure

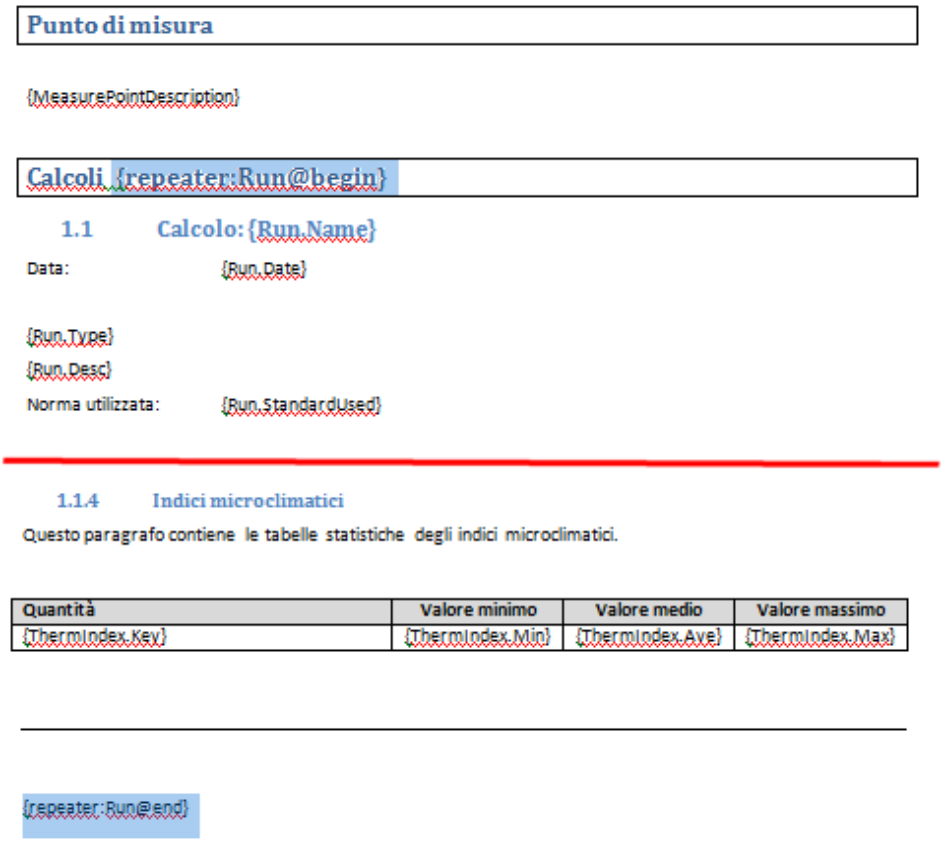
The keys highlighted in yellow are obsolete compared to the 2023 version of the standard and are therefore no longer considered in the new calculations carried out with version 1.9 of the program.

5.12.2.5. Loading reapeted elements

Besides tables lines you can add repeated complex data. E.g.: this kind of situation occurs in the report on a single measure point carrying more calculations: the section related to calculations keys has to be repeated for each calculation resent in the measure point.

For this action you need to enclose in brackets the Keys of all the calculations data:
`{repeater:Run@begin} and {Run@end}repeater:`

In the following example the *Calculations* paragraph is repeated for each calculation contained in the measure point:

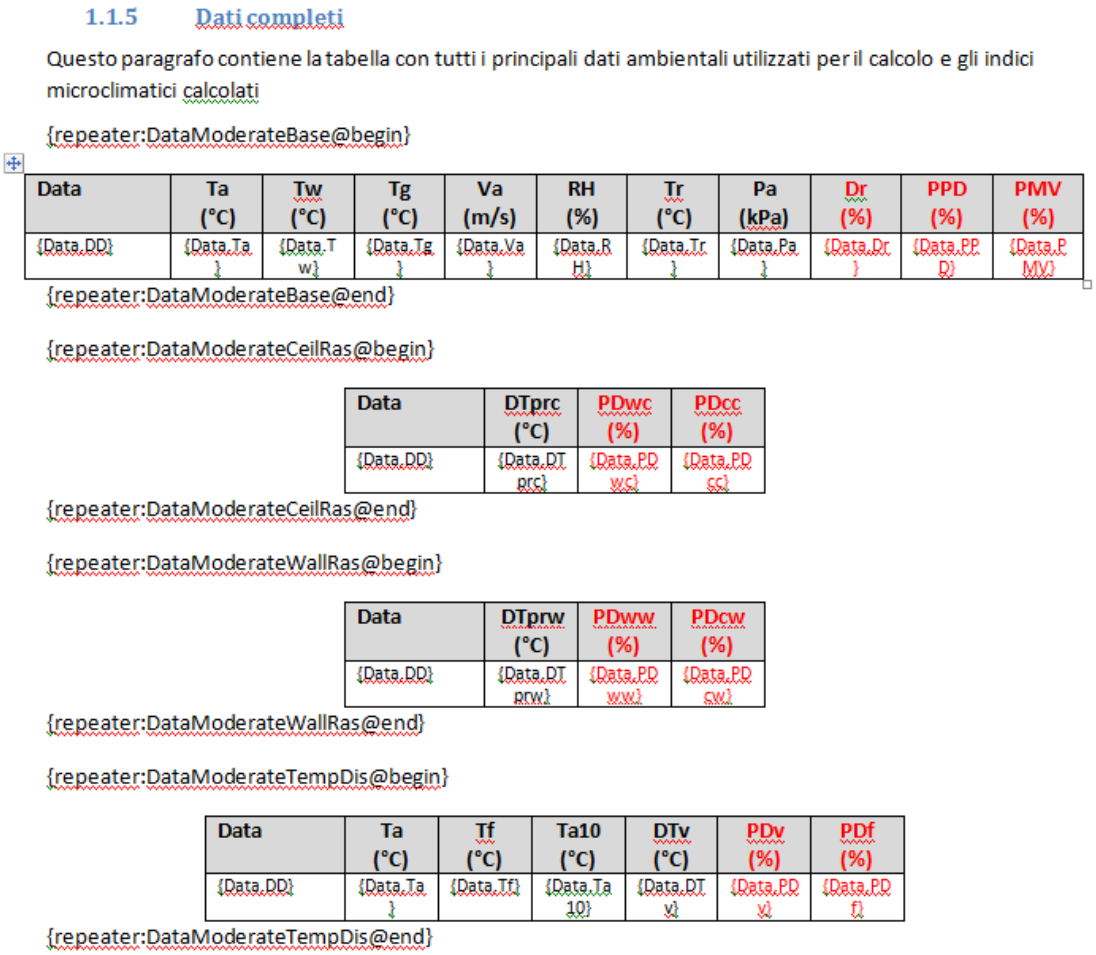


Repeating key table:

Key	Meaning
Moderate Base	
{Repeater:Run@begin} {Repeater:Run@end}	To enclose the Calculation section
{repeater:DataModerateBase@begin} {repeater:DataModerateBase@end}	To enclose the data table of moderate base calculations (*)
{repeater:DataModerateCeilRas@begin} {repeater:DataModerateCeilRas@end}	To enclose the data table of moderate base for calculation of ceiling radiant asymmetry (*)
{repeater:DataModerateWallRas@begin} {repeater:DataModerateWallRas@end}	To enclose the data table of moderate base for calculations of wall radiant asymmetry (*)
{repeater:DataModerateTempDis@begin} {repeater:DataModerateTempDis@end}	To enclose the data table of temperature dissatisfied (*)
WBGT	
{repeater:DataHotWBGT@begin} {repeater:DataHotWBGT@end}	To enclose the data table of WBGT calculations
PHS	
{repeater:Out@begin} {repeater:Out@end}	To enclose the data table of PHS calculations
Cold stress	
{repeater:DataColdBase@begin}	Da utilizzare per racchiudere la tabella

{repeater:DataColdBase@end}	To enclose the data table of the indices IREQ, Dlim, TWC
{repeater:DataColdRecovery@begin} {repeater:DataColdRecovery@begin}	To enclose the data table of the indices Drec

(*) these repeating keys are not meant only to duplicate elements but to generate a unique model containing all the tables for all possible calculations: if each table is enclosed in the correspondent repetition keys enclosed, the generated report will show only the table relative to the real run calculation. The following model is an example that can be used for all types of moderate calculations:



1.1.5 Dati completi

Questo paragrafo contiene la tabella con tutti i principali dati ambientali utilizzati per il calcolo e gli indici microclimatici calcolati

{repeater:DataModerateBase@begin}

Data	Ta (°C)	Tw (°C)	Tg (°C)	Va (m/s)	RH (%)	Tr (°C)	Pa (kPa)	Dr (%)	PPD (%)	PMV (%)
{Data.DD}	{Data.Ta}	{Data.Tw}	{Data.Tg}	{Data.Va}	{Data.RH}	{Data.Tr}	{Data.Pa}	{Data.Dr}	{Data.PPD}	{Data.PMV}

{repeater:DataModerateBase@end}

{repeater:DataModerateCeilRas@begin}

Data	DTprc (°C)	PDwc (%)	PDcc (%)
{Data.DD}	{Data.DTprc}	{Data.PDwc}	{Data.PDcc}

{repeater:DataModerateCeilRas@end}

{repeater:DataModerateWallRas@begin}

Data	DTprw (°C)	PDww (%)	PDcw (%)
{Data.DD}	{Data.DTprw}	{Data.PDww}	{Data.PDcw}

{repeater:DataModerateWallRas@end}

{repeater:DataModerateTempDis@begin}

Data	Ta (°C)	Tf (°C)	Ta10 (°C)	DTv (°C)	PDv (%)	PDf (%)
{Data.DD}	{Data.Ta}	{Data.Tf}	{Data.Ta10}	{Data.DTv}	{Data.PDv}	{Data.PDf}

{repeater:DataModerateTempDis@end}

This solution can generate unwanted blank lines in the report: in this case create a new report on a specialized type of calculation or on a specialized type of environment by eliminating unwanted tables.

5.12.2.6. Loading graphs

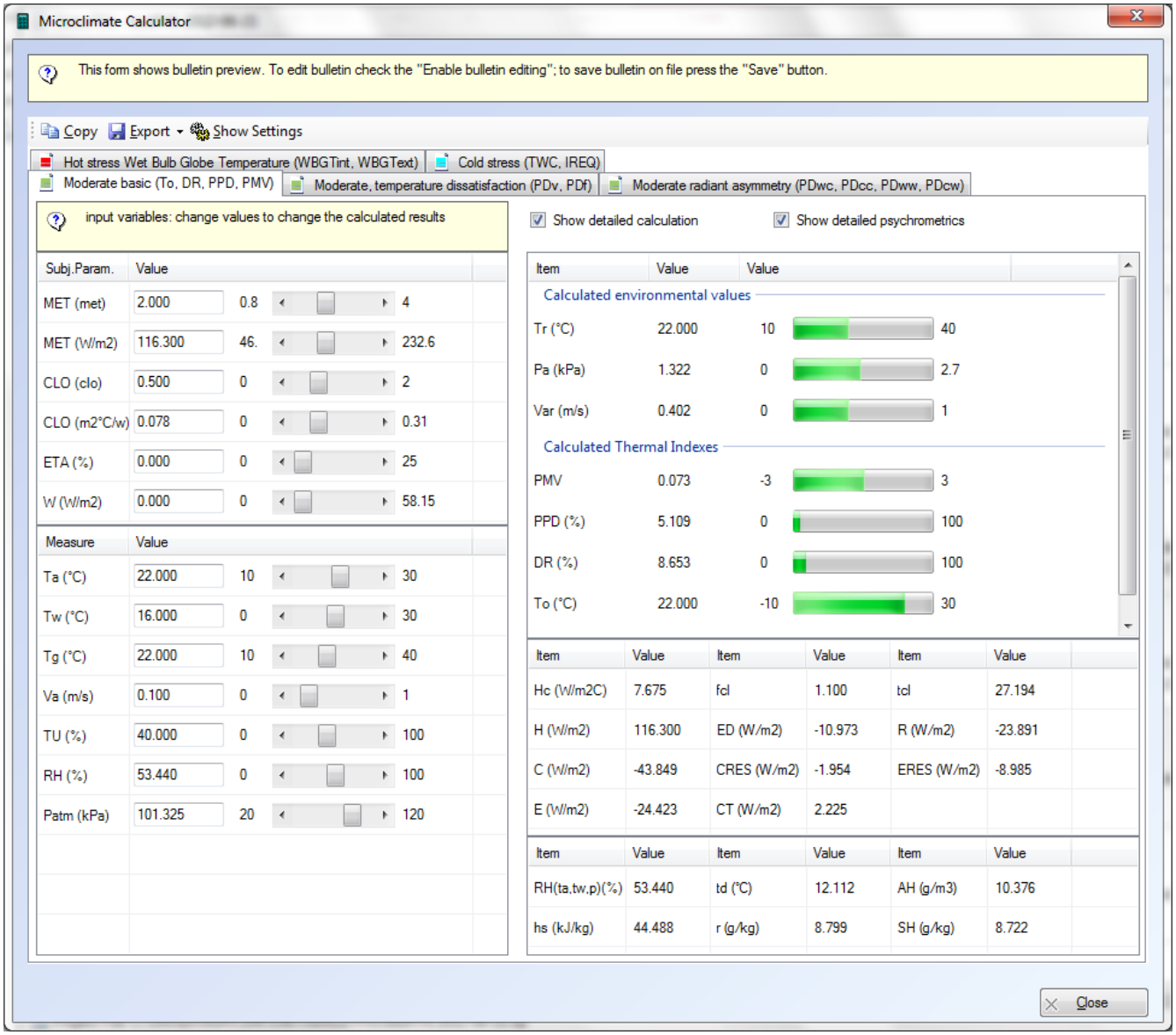
This version of the program doesn't have an automatic function to configure and load graphs into the report. To load a graph into a report you have:

- select the calculation generating the report;
- press the <*Create Report*> button to generate the report selecting
- press the <*Show Data*> button to view the data generated from the calculation;
- press the <*Copy*> button to modify the view settings of the graph and copy it in Windows Memory;

- press the <*Paste*> button to paste the graph into the point of the *Report View* program.

5.13. The calculator

Select the menu *Tools* → *Microclimate Calculator* to start the program of instantaneous microclimatic calculation.



The calculator can calculate directly the microclimatic indices of different environments.
As for the project calculations also the calculator is divided in four sectors corresponding to the available calculations:

- Moderate base: to, DR, PPD, PMV indices;
- Moderate, temperature dissatisfaction: PDv, PDf indices;
- Moderate, radiant asymmetry: PDwc, PDcc, PDww, PDcw indices;
- Hot Wet Bulb Globe Temperature: WBGTint, WBGText indices.
- Cold stress: IREQ, IclReq, Dlim. TWC, Drec

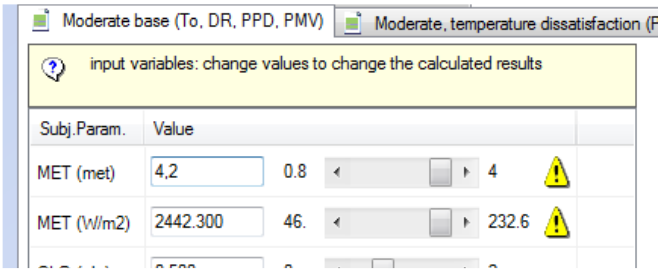
The calculation panel of the calculator is divided in two sections:

- on the left there are the entry data that can be modified loading directly the value in the textbox or with the mouse;

- on the right there are the calculated values shown as numeric value and as scrollbar. Modifying the entry values, the calculated values are updated in real time.

When using the calculator remember that:

- few entry data are connected among them:
  - subject parameters are expressed in two unity measure, so if for example you modify the MET value, also the MET in W/m2 value will be automatically modified in met;
  - RH, Ta, Tw and P quantities of the Moderate base are linked among them; the modification of Ta, Tw or P will be reflected in the RH modification, vice versa the RH modification influences only the Tw value.
- pointing the mouse over the abbreviation of the calculated index it is possible to view its extensive description;
- the cold environment calculator uses only some environmental variables (Ta, Tr, Va and RH) and calculates the Pa always using Ta and RH regardless of the program general settings;
- the hot environment calculator integrates the new features introduced with the standard adjustment of 2017: it is possible to insert the subject's metabolic activity and the clothing adjustment factor to evaluate the effective WBGT of the subject and the analytical limits (WBGTref) calculated using the real value of the activity metabolic.
- the <*Show Settings*> button shows the options used for the calculations, which are the same used at the project level (§ 5.9.1); if you use the option to make calculations also when the entry values are exceeding the limits accepted by the calculator it marks the error with an icon, but still proceeds with the calculation and shows anyway the calculation results;



- the <*Copy*> button copies the data of the active window in the clipboard of Windows where they can be pasted into other applications that support the copy-paste Windows function;
- the <*Export*> button exports data of the active window to a text file or to Excel xml file.

5.14. Use license

To make a microclimatic calculation you need the license file associated to the serial number of the instrument used for environmental measure.

The specific license of the microclimatic environment type where each single instrument can be used.

In order to use user-defined data there must be at least one instrument with valid license for the environment to be simulated.

5.14.1. Licenses Manager program

Use menu *Tool* → *Licenses Manager* to run the program *LSI License Center* that manages the LSI programs licenses installed on the local computer.

The *LSI License Center* program is one of the components of the *LSI Support Center* program that can be directly installed from the LSI LASTEM products CD or from the Licenses files CD. You can also download the installer file from the of the LSI LASTEM FTP site. The *LSI Support Center* also contains the component that verifies the availability of the new versions of the LSI LASTEM programs installed in the computer (§**Errore. L'origine riferimento non è stata trovata.**).

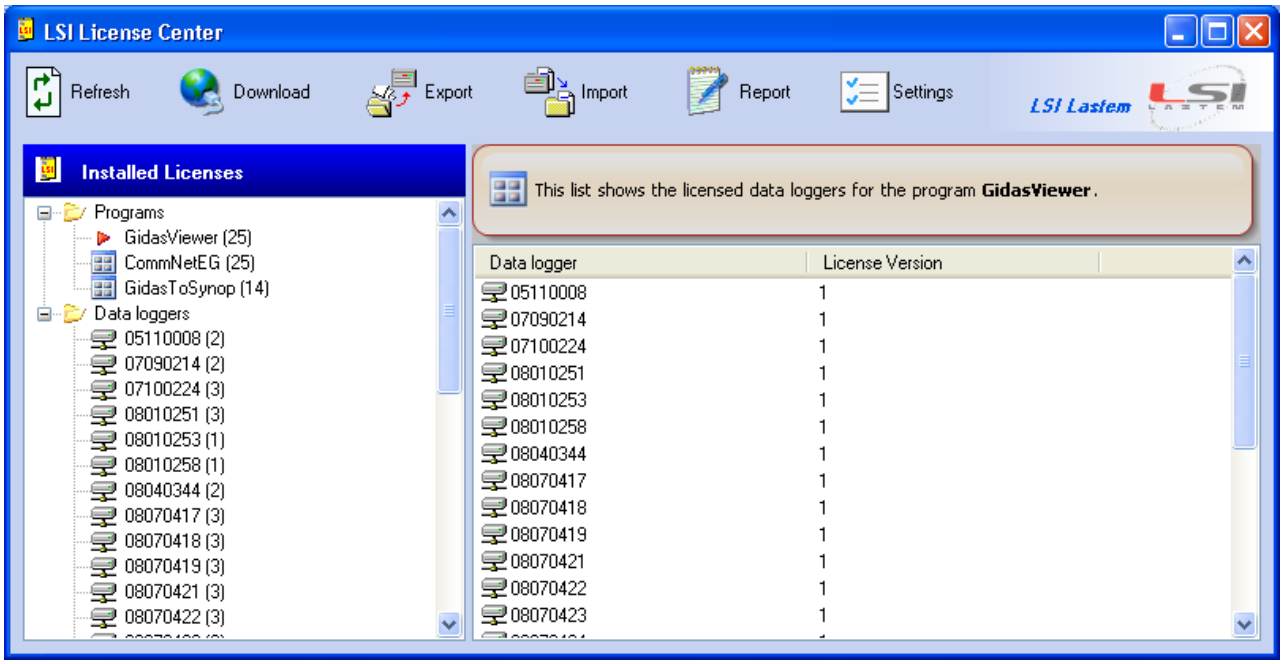
5.14.1.1. Program installation from FTP site

If the License Manager Program is not installed in the local computer you can download the installation file from the LSI LASTEM FTP site. At the end of downloading the installation will automatically starts; at the end of the installation the program will be started.

5.14.1.2. Program use

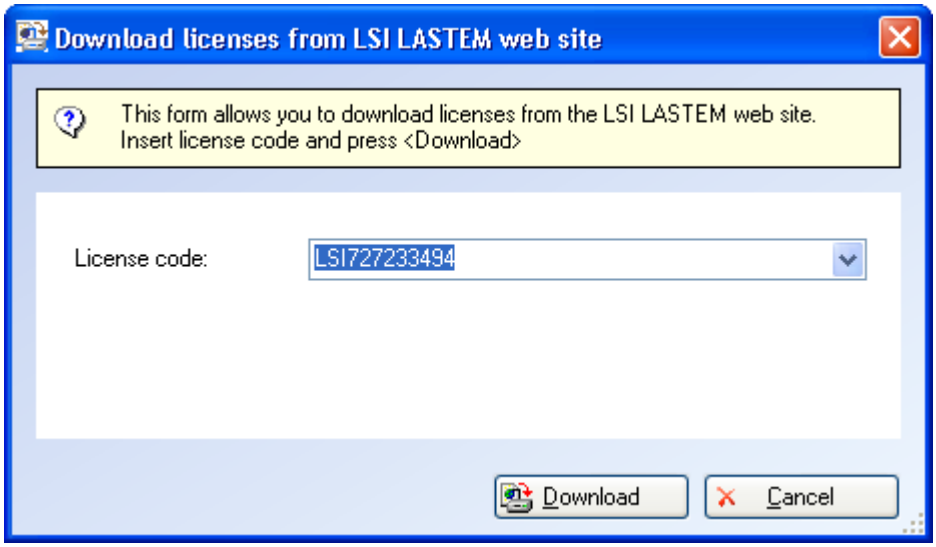
The program visualizes all the installed licenses in the computer divided for single programs or single tools. This program can:

- export the selected licenses in an archive file;
- import an archive licenses file in the local computer;
- produce a simple text file report with the list of the installed licenses in the computer;
- directly download the licenses archives from the LSI LASTEM site;



The licenses archive is constituted only by *.lsilic* zip file extension. This is the format of licenses distributed by LSI LASTEM.

Every licenses archive can be downloaded from the LSI LASTEM site inserting the License Code supplied by LSI LASTEM at the purchase of the programs.



Through the <*Settings*> button it is possible to set the parameters of the Internet communication in the case it is present a server proxy.

5.15. Configuration file inside the program

GidasTEA.UI.exe.confi.g is the configuration program in .xml format containing few settings for the functioning of the program.You can force the program to use a different language from the predefined one by modifying the property value in *UserDefinedCulture*:

```
<applicationSettings>
    <GidasTEA.UI.Properties.Settings>
        <setting name="UserDefinedCulture" serializeAs="String">
            <value></value>
        </setting>
    </GidasTEA.UI.Properties.Settings>
</applicationSettings>
```

To force the use of English language on a computer running in Italian, you have to import the value `<value>en-us</value>`; for the use of Italian language in a computer running in another language insert the value `<value>it-it</value>`; no other location is available.

5.16. Program update

Use menu *?* → *Check for updates* to run the program *LSI Update Center* that verifies the availability of the new versions of the LSI LASTEM programs installed in the computer.

The *LSI Update Center* program is one of the components of the *LSI Support Center* program that can be directly installed from the LSI LASTEM products CD or from the licenses files CD or downloading the installer file from LSI LASTEM FTP site. The *LSI Support Center* also contains the component that manages the licenses of the programs installed on the local computer.

5.16.1. Installing the program from FTP site

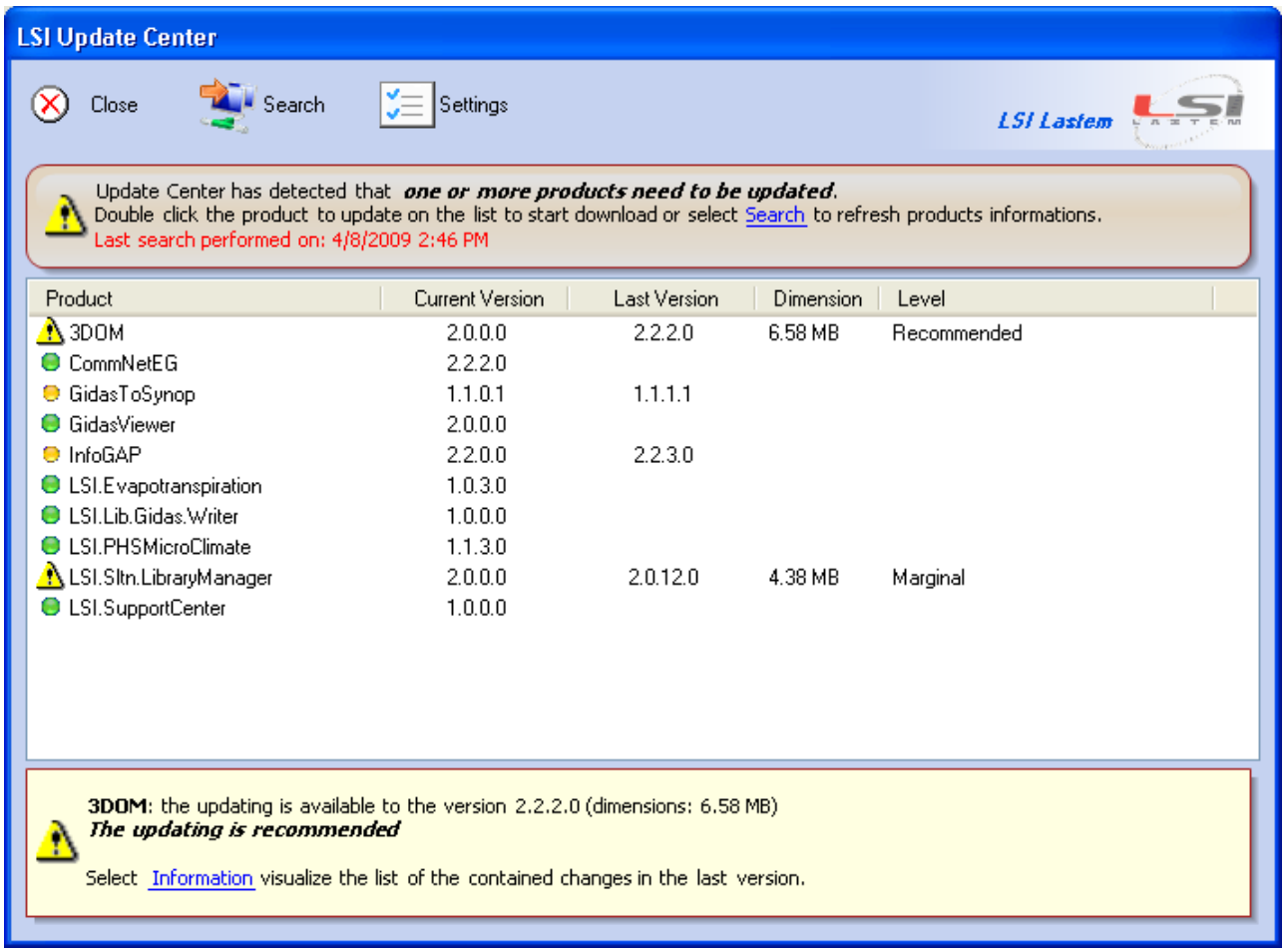
If the program *LSI Update Center* is not installed in the local computer you can download the installation file from the LSI LASTEM FTP site. At the end of the downloading the installation will automatically starts; at the end of the installation the program will be started.

5.16.2. Program use

The *LSI Update Center* program is composed from two modules:

- the program *LSI Update Center Monitor* that is started in automatic with the operating system and that verify periodically the available updates for all the LSI LASTEM programs installed in the computer;
- the program *LSI Update Center* shows the state of the available updates and, if the case, downloads from the LSI LASTEM web site the files of installation and starts the upgrade.

The program *LSI Update Center* shows the state of the LSI LASTEM programs installed in the local computer:



For every program the installed run version and the last available version is visualized.
A program can be:

- Up to date;
- Not updatable: a new version exists but the product is not updatable;
- Updatable: double click the product to update on the list to start download the installer file.

Selecting *Information* you can visualize a web page containing the list of changes of all the versions of the selected program.

Through the button <*Search*> is update the search of the updates and through the button <*Settings*> are modified the connection properties, if a proxy is used, and the temporal interval used by the monitor for the automatic search for updates.

Remind that when this program is started by the menu *Start* → *Programs* of Windows or from the contextual menu of the monitor, the program visualizes the results of the last automatic search operated by the automatic monitor visualizing the date of the search. To update the data press the button <*Search*>.