

TERGOMATIC

BY S.K.M.
SYSTEM FOR THE CONTROL OF RISING DAMP CAUSED BY CAPILLARY ACTION



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Rising damp

caused by the phenomenon of capillary action in all walls having direct contact with damp ground and with aquifers





TERGOMATIC by S.K.M.

Sustainable housing technology, completely reversible and non-invasive, against rising damp through capillary action.

No wires, cables or electrodes in the wall.



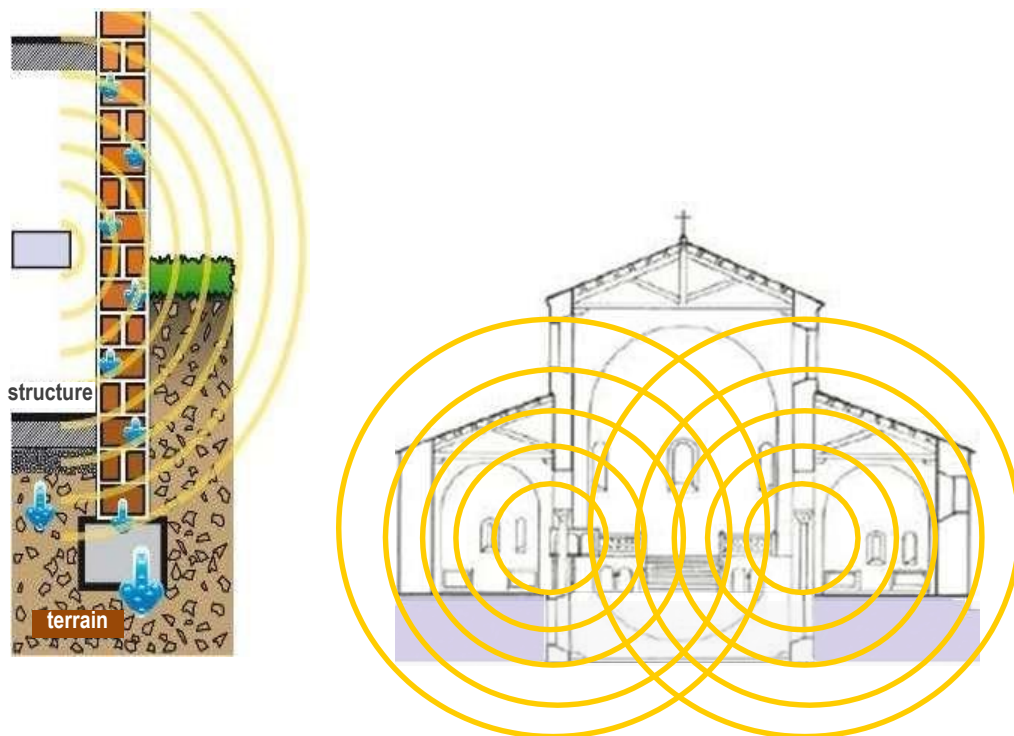
**Certified by leading institute legally recognised
at national level**



Operation

Sophisticated technology at the service of any building works carried out by man for his own needs.

The Tergomatic system by S.K.M, based on the system for "controlling rising damp caused by capillary action" is used, without limitation, for the recovery and restoration of sacred buildings, monuments, educational structures, dwellings, hospitals, public and industrial constructions etc, affected by phenomena of internal rising damp through capillary action in the walls.



The Tergomatic by S.K.M equipment reacts on the building's wall structure, irrespective of the material used in construction: clay, stone, brick, volcanic tuff, rubble masonry, mixed walling in reinforced concrete, etc.

The field generated, with spherical wave fronts of a radius between 10.15 and 20 meters, allows for the de-humidifying applying to the whole affected structure uniformly, thus including all the variously oriented surface areas, including horizontal ones in direct contact with the ground.



SUMMARY OF THE PHYSICAL OPERATIONAL PRINCIPLE

EFFECT OF THE SALTS PRESENT IN WATER

When any salt dissolves in water, the individual molecules of solution (salt) spread out evenly into the mass of liquid (solvent) in such a manner that each volume unit of solution (mixture) dissociates itself, forming many negative and positive ions which remain in solution together with the other, non dissociated, molecules.

Thereby consists the phenomenon of electrolytic disassociation and the solutions are called electrolytic solutions.

These have the characteristic property of allowing themselves to be traversed by electric currents through ionic conduction, which takes the name of electrical conductivity, as against distilled water (pure water) which behaves as a perfect insulant.

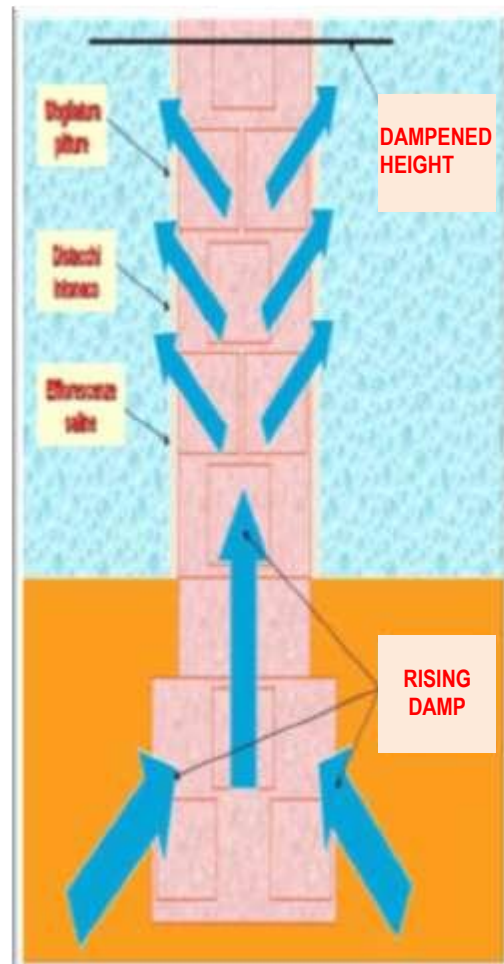
EFFECTS OF THE TERGOMATIC by S.K.M SYSTEM ON WALLING

Tergomatic by S.K.M is placed directly onto the wall and encloses, within a small device are innovative circuits, digital microprocessors and components of the latest generation.

Thus the emission of an electromagnetic field is activated which could be defined as an inductor; this device, acting on and thereby integrating with the wall, induces in the same the presence of an electromagnetic field which influences the behaviour of the electrical charges (anions, cations and dipoles of water) present in the wall itself.

This phenomenon is defined as a: "System for the control of rising damp caused by capillary action", in that it reacts on the difference of potential between the water dipoles and the wall itself.

The above description is a simplified summary of the operational principle of our exclusive technology "System for the control of rising damp caused by capillary action".



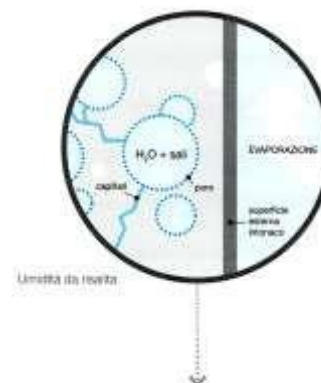


THE MELLONCELLI TERGOMATIC by S.K.M TECHNOLOGY

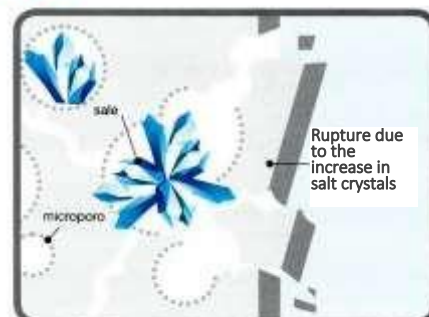
Damage to buildings

Here we have damage to walls caused by humidity:

- Stains at the base of the wall.
- Destruction of plasterwork.
- Emergence of mildew.
- Increase in the dispersion of heat from the building.
- Colder walls and formation of condensation.
- Separation of the surface from certain stone and clays through the effect of crystallisation of salts.
- Possible freezing of the humidity and water content of the wall, within the capillary system, which increases in volume and induces deteriorating forces.
- Chemical and physical reactions between the substances carried by the humidity and those present in the structure; which, transported by the water and humidity, penetrate and spread throughout the structure and plasterwork, producing altering forces.
- Production of substances of a biological nature throughout where humidity is present, which feeds the process.



✗ behaviour of normal plaster





ELECTRICAL AND MAGNETIC FIELDS

(do not cause illness or damage to man)

Indicative values of electrical fields generated by a number of electrical appliances at various distances from the body, compared with the emissions from Tergomatic by S.K.M.

Examples of field density at various distances (B values in microTesla μT)

Electrical appliance	Close by	10 cm	20 cm	30 cm	The value is greater by	
TERGOMATIC by S.K.M.		0,8	0,3	0,14		
Fridge	0,5 ÷ 1,7	1,5	1	0,25	2	times
Radio cassette	0,3 ÷ 15	2	0,8	0,4	3	times
14" television	2 ÷ 7	2,5	1	0,5	3	times
Fan	30 ÷ 50	2,9	0,4	0,15	4	times
Filament lamp	60	3,8	0,85	0,27	5	times
Washing machine	0,1 ÷ 27,5	12,6	10	7,2	16	times
Blender	50 ÷ 230	14	3,5	1,5	18	times
Vacuum cleaner	2 ÷ 235	20	7	3	25	times
Electric razor	50 ÷ 1300	20	5	1,7	25	times
Hair dryer	40 ÷ 100	40	5	1,5	50	times



Installation examples

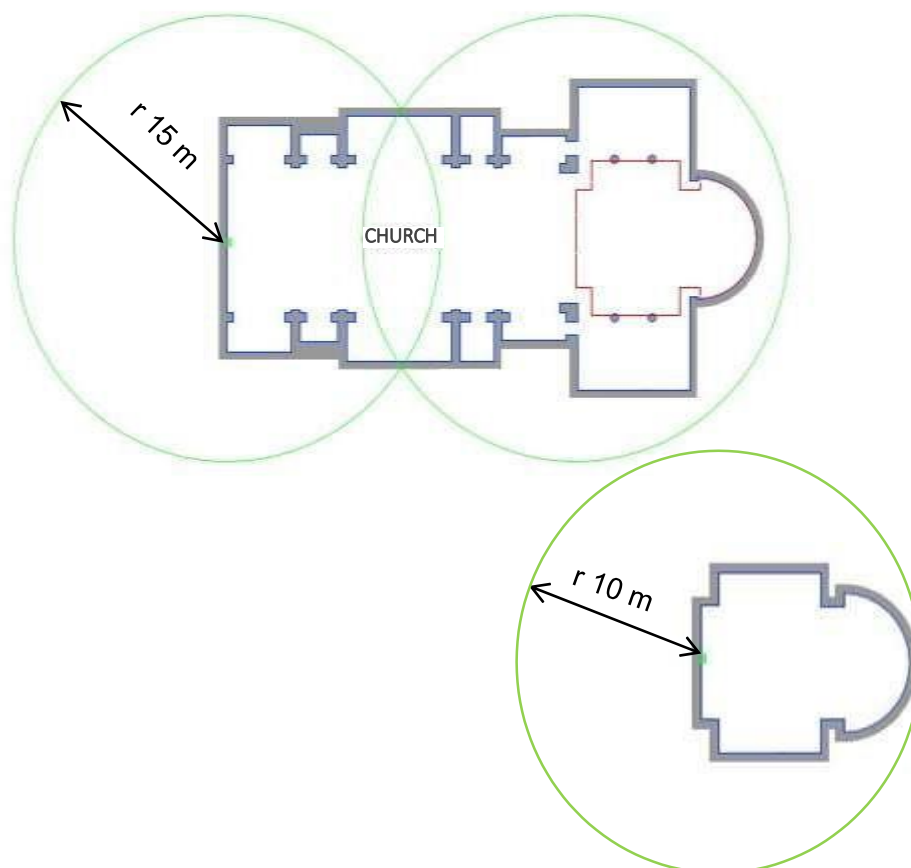
The unit's field of action
(10 – 15 – 20 m spherically)

Limiting dimensions of the building with one unit only

Tergomatic by S.K.M. **DM10** (radius 10): m. 14 x 14 = m² **196**

Tergomatic by S.K.M. **DM15** (radius 15): m. 20 x 20 = m² **400**

Tergomatic by S.K.M. **DM20** (radius 20): m. 28 x 28 = m² **784**





Dimensions

"TERGOMATIC by S.K.M."

Small dimensions for minimum encumbrance

The dimensions of our machines allow for installing them even internally, or behind your building, enabling them to be out of sight.

Dimensions: Approx. 200x120x90 mm.





Technical characteristics “TERGOMATIC by S.K.M.”

Technical characteristics of the TERGOMATIC_{by S.K.M}	
Power supply	230 V - 50 Hz
Consumption	Approximately 3 Wh
Insulation	class II according to standard CEI EN 60335-1 (1998)
Level of protection	IP 66 according to standard CEI EN 60529 (1997)
Effective radius	from 10 - 15 20 meters depending on the model
Labelling	CE certifies conformity with EEC directive 73/23 (safety of electrical products) and EEC 89/336 (electromagnetic compatibility)



Technical characteristics “TERGOMATIC by S.K.M.”

**Only four 6 mm holes in the wall and, lastly,
insert the plug into the Schuko socket,
powered 24 hours a day**

Front view



- **RED** fault indicator
- **GREEN** indicator for correct operation
- **Display panel:**
 - **TIMER** indicator with operation times
 - voltage intake indicator
 - Frequency indicator



Measuring methods

- **Hygro LAB** by IBIX



- **Mobile LAB** by IBIX



- **Measuring method with thermos-camera**



- **Measuring carried out with CM hygrometer (calcium carbide method)**

- **Non invasive method: Measuring with electromagnetic induction and thermographic survey**





Measuring methods with:

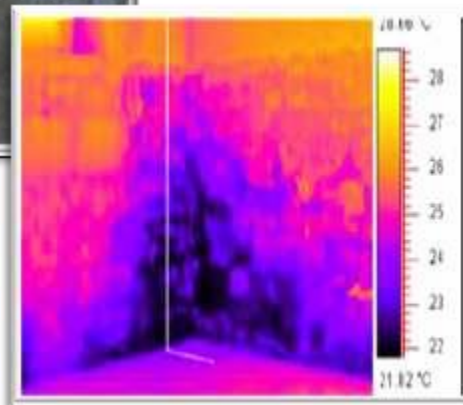
Mobile LAB by IBIX

Hygro LAB by IBIX

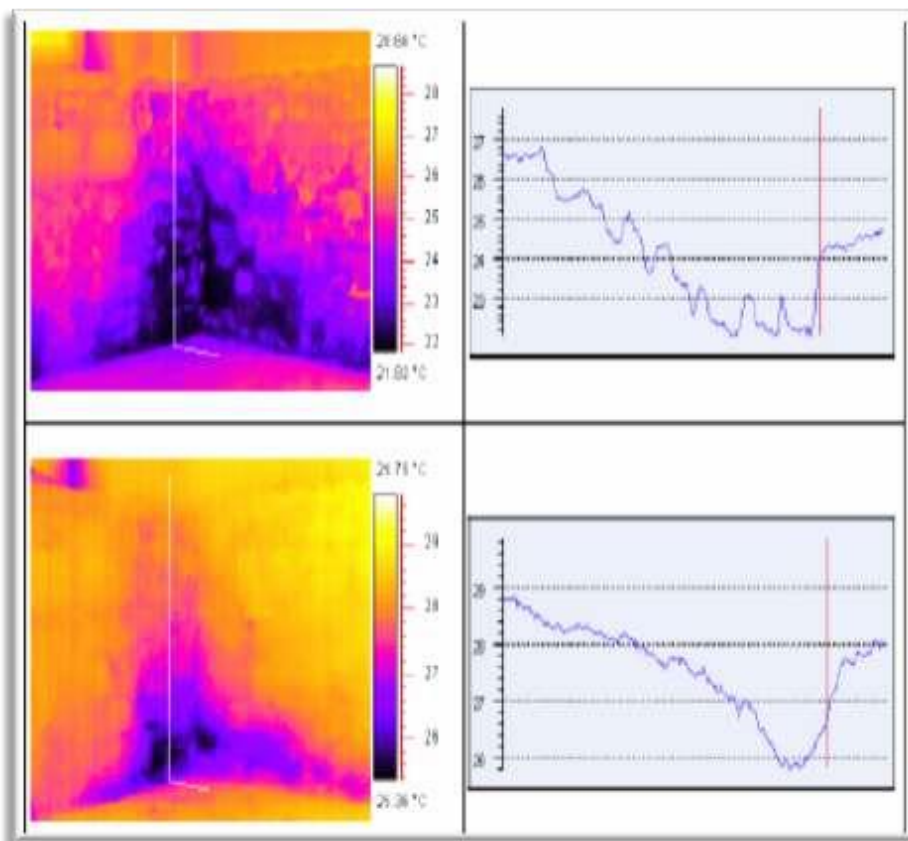
 <p>OPTICAL MICROSCOPE</p> <p>Microscopic analysis hygrometer</p>	 <p>SOFTWARE FOR COMPILING REPORTS</p> <p>mobile lab for Linux - v.1.0</p>	 <p>THERMO-HYGROMETER</p> <p>Optical thermo-portable</p>	 <p>ANALYSIS OF SULPHATES, NITRATES, CHLORIDES</p> <p>UNI 11087:2003 - Cultural property - Natural and artificial stone - Determination of soluble salt content</p>	 <p>HYGROMETER</p> <p>Measurement of environmental parameters Infrared pyrometer</p>
 <p>ANALYSIS OF SULPHATES, NITRATES,</p> <p>UNI 11087:2003 - Cultural property - Stone materials natural and artificial - Determination of soluble salt content</p>	 <p>MEASUREMENT OF TOTAL SOLUBLE SALTS and PH</p> <p>UNI 11085:2003 - Cultural property - Stone Materials natural and artificial - "Determination of water content: Weighting method"</p>	 <p>HUMIDITY WEIGHTING METHOD</p> <p>UNI 11087:2003 - Cultural property - Stone materials natural and artificial - Determination of soluble salt content</p>	 <p>SAMPLE PREPARATION FOR LABORATORY ANALYSIS</p> <p>On site sample collection</p>	 <p>LASER THERMOMETER</p> <p>Measurement of environmental parameters Infrared pyrometer</p>
 <p>COLOUR MEASUREMENT</p> <p>EN 15886:2010 "Conservation of cultural property - Test methods - Colour measurement of surfaces"</p>	 <p>HYGROMETER</p> <p>Measurement of environmental parameters Infrared pyrometer</p>	 <p>ABSORPTION WATER AT LOW PRESSURE</p> <p>NORMAL 44/93 "Absorption of water at low Pressure"</p>	 <p>SOFTWARE FOR COMPILING REPORTS</p> <p>HygroLab for Linux - v.1.0</p>	 <p>THERMO-HYGROMETER</p> <p>Portable thermo-hygrometer</p>
 <p>SAMPLE PREPARATION FOR LABORATORY ANALYSIS</p> <p>On-site taking of samples</p>	 <p>LASER THERMOMETER</p> <p>Measurement of environmental parameters Infrared pyrometer</p>	 <p>HUMIDITY WEIGHTING METHOD</p> <p>UNI 11087:2003 - Cultural property - Natural and artificial stone - Determination of soluble salt content</p>	 <p>MEASUREMENT OF TOTAL SOLUBLE SALTS and PH</p> <p>UNI 11087:2003 - Cultural property - Natural and artificial stone - "Determination of water content": Weighting method"</p>	



Measuring method with THERMOCAMERA



Thermo-camera
for
thermographic
sampling





Measurements carried out with CM hygrometer

(calcium carbide method)



Rapid measurement of the humidity of a wall sample in a loosened condition, using a hydration process of the calcium carbide.

**(standard UNI 1121 of May 2004
“Cultural property – natural and
artificial stone materials – On-site
determination of water content:
Calcium carbide method”).**

The Calcium Carbide reacts when in contact with water or humidity contained in the material and, following this reaction, a pressure is generated in the form of gas (Acetylene). On the basis of the weighed quantity of the material under examination, and the pressure generated, the respective humidity content can be deduced in CM%, using a table,

CM Hygrometer technical data	
Range of pressure	0 ÷ 1,6 bar
Sub division	0,05 bar
Safety Pmax	2 bar
Precision	± 1,6 %
Temperature of use	-10 ÷ 80 °C
Manometer body	Steel sheet
Casing resistance	Class IP32



Non-invasive method: Measuring with electromagnetic induction and thermographic survey



THERMOGRAPHIC SAMPLING:

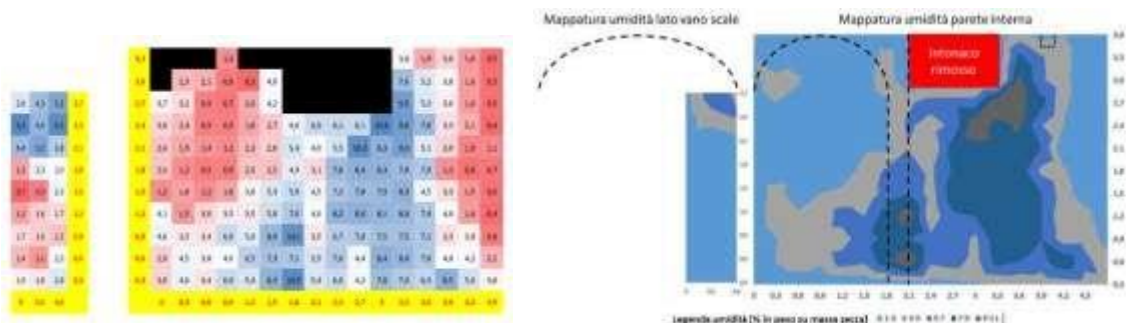
Thermographic sampling within a building constructed with plastered surfaces and not for the identification, evaluation and related geometric restoration, on graphic documentation previously prepared by the client, of concealed architectural elements, of the wall texture, and the presence of humidity. The whole carried out with portable instrumentation which is sensitive to infrared, following thermal conditioning of the elements under investigation through use of hot air generators. The whole carried out according to the requirements of standard UNI 9252 and ISO 6781, returned with photographic certification of the anomalies and degradation according to UNI 9124, IR images, computerized post-processing of the IR images, video on site and a detailed summarised technical report

Non-destructive measuring by electromagnetic induction which exploits the capacity of the water molecules to attenuate, and therefore modify, the magnetic fields. The magnetic field will penetrate into the material through the instrument's contact probes and create a field of measurement of some 5 cm in depth. The instrument supplies the water content value as a weight percentage in comparison with the dry mass (%) on the basis of characteristic curves for each material.

The values are measured on a grid defined geometrically on the wall to be analysed, with the creation of humidity maps in false colours made up of "contour plot" type graphics.

Instrument used: **TESTO 616**

- Range of measurement on wood: <50%
- Range of measurement on construction materials: <20%
- Resolution: 0,1%
- Depth of measurement: Up to 5cm (NB: The external layers of the material greatly influence the result of the measurement in that the external layers are not covered)





Measuring of humidity and verification:

- **The first measurement will be carried out before installation of the system.**
- **The first verification after 6-9 months following installation.**
- **The second verification after 18-24 months following installation.**
- **The third verification will be carried out at the end of the 36th month, only if the values of the trials on the preceding verification are above the normal (by normal, we mean values beneath 2.5% - max 3.0%).**



Lowering of humidity

- ◇ **A STONE building will show an average reduction in humidity of approximately 20% after only 3-6 months**
- ◇ **A CONCRETE building will show an average reduction in humidity of approximately 30% after only 3-6 months**
- ◇ **A BRICK building will show an average reduction in humidity of approximately 45% after only 3-6 months**
- ◇ **A SANDSTONE building will show an average reduction in humidity of approximately 50% after only 3-6 months**

After that, the process will continue at a slower pace, until the humidity arrives at normal values, which will occur after 12-18-24 months and in the most difficult cases, within 36 months, depending on the type of material and on the quantity of water humidity contained within the walls.



***The "TERGOMATIC units by S.K.M"
are installed in:***

Private dwellings	Schools
Condominiums	Hospitals
Churches	Offices
Basilicas	Hotels
Monasteries	Apartment
Oratories	blocks
Convents	Houses
Sanctuaries	Banks
Museums	Libraries
	Popular housing



DECLARATION OF CONFORMITY



Melloncelli S.r.l.

Via Argine Po, 174

46028 Sermide (MN)

Italy

Declares that:

TERGOMATIC by S.K.M.

conforms with directives

- ⊙ EEC 73/23 safety of electrical products
- ⊙ EEC 89/336 Electromagnetic compatibility

Standards to which conformity is declared:

- ⊙ **Safety**
CEI EN 60335-1 (2002)

- ⊙ **EMC**

Emissions

CEI EN 55011 (2009) - CEI EN 61000-6-3 (2007)

Immunity

CEI EN 61000-3-2 (2007) - CEI EN 61000-3-3 (2009)

CEI EN 61000-4-2 (1996) - CEI EN 61000-4-3 (2007)

CEI EN 61000-4-4 (2006) - CEI EN 61000-4-5 (2007)

CEI EN 61000-4-6 (2009) - CEI EN 61000-4-8 (1997)

CEI EN 61000-4-11 (2006) - CEI EN 61000-6-2 (2006)

- ⊙ **Safety regarding Human Exposure to Electromagnetic Fields**

CEI EN 62233 (2008)

REFERENCES Emilia Romagna



San Paolo Maggiore - Bologna



Clarisse Convent - Forlì



S. Giorgio Cathedral - Ferrara



*Church of S. Andrea in Rossano
Forlimpopoli (FC)*



Reno Centese Church S. Anna (FE)

REFERENCES Lombardy



Hebrew Museum - Casale Monferrato



*Natività Parish S. Giovanni Battista
201470 (BS)*



Nuovo Robbiano Soresina (CR)



Monza - Santa Maria delle Grazie

REFERENCES



Church of S. Giacomo - Sustinenza (VR)



Bologna Santa Caterina



Imola -



Sassuolo (MO) - Villa Belvedere



Clarisse Monastery -



RENO CENTESE ***Church of S. Anna***





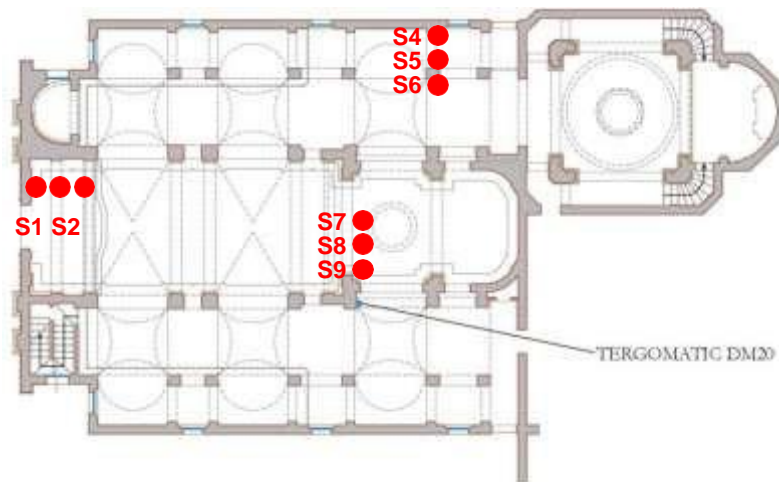
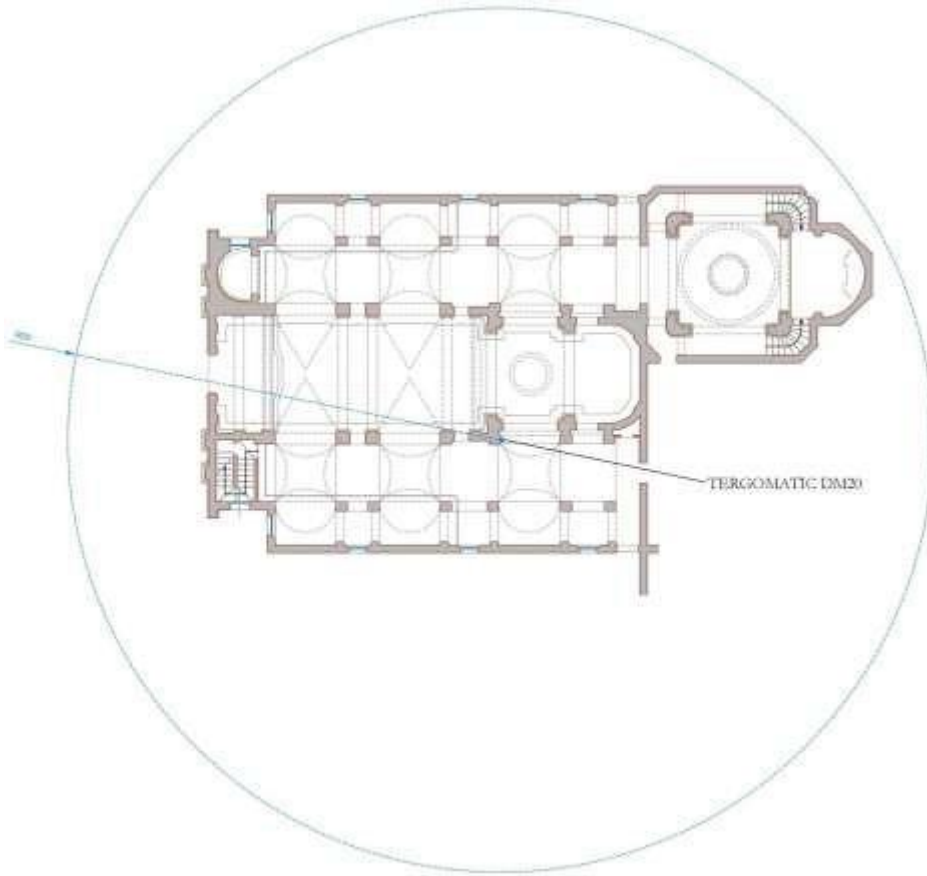
RENO CENTESE ***Church of S. Anna***





RENO CENTESE

Church of S. Anna





RENO CENTESE Church of S. Anna

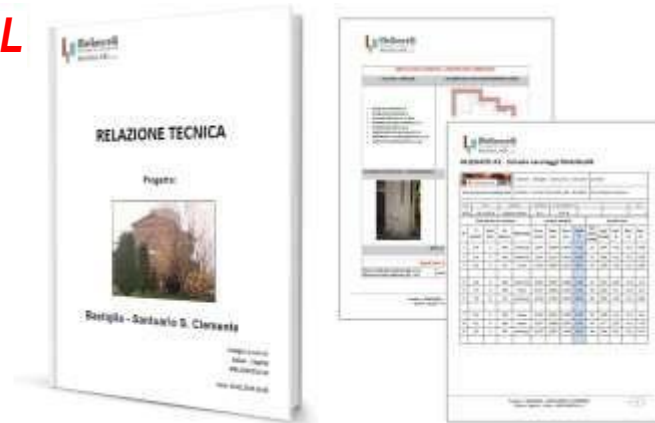
SAMPLING	
DATE OF SAMPLING	PLANS WITH POSITIONING OF TESTS
<ul style="list-style-type: none"> • SAMPLE NAME: S1 • DATE OF SAMPLING: 25.09.2014 • TEMPERATURE OF THE SURFACE: 19.2 • AIR TEMPERATURE: 19 • RELATIVE HUMIDITY OF THE AIR [%]: 76 • DEPTH OF SAMPLING [cm]: 12 • HEIGHT OF SAMPLING [cm]: 200 	
PHOTOGRAPH BEFORE	PHOTOGRAPH AFTER SAMPLING

ANALYSIS OF HUMIDITY USING THE WEIGHTING SYSTEM	<p><i>Humid mass of the sample [g]: 4.313</i></p> <p><i>Dry mass of the sample [g]: 4.224</i></p>	<p><i>Water content in % on the basis of dry weight: 2.11</i></p>
MEASURE OF TOTAL SOLUBLE SALTS - CONDUCTIVITY	<p><i>Mass of the sample [mg]: 101</i></p> <p><i>Quantity of water [mL]: 100</i></p> <p><i>Conductivity of water [µS/cm]: 0</i></p>	<p><i>Conductivity calculated according to UNI11087-2003 [µS/cm]: 53</i></p>
QUANTITY ANALYSIS OF SULPHATES, CHLORIDES	<p><i>Mass of the sample [mg]: 101</i></p> <p><i>Quantity of water [mL]: 100</i></p> <p><i>Concentration of SULPHATES</i></p> <p><i>Concentration of NITRATES [mg/L]: 0.38</i></p> <p><i>Concentration of CHLORIDES [mg/L]: 2.40</i></p>	<p><i>PERCENTAGE OF SALTS BY MASS IN RELATION TO THE SAMPLE (ACCORDING TO 11087/2003) [%]:</i></p> <p><i>SULPHATES = <0.5%</i></p> <p><i>NITRATES = <0.1%</i></p> <p><i>CHLORIDES = 0.23%</i></p>




RENO CENTESE Church of S. Anna

**ONE CLICK TECHNICAL
REPORT**



MobileLAB probing report

		Works site: Reno Centese Church of S. Anna			Contacts:		
technical services mobile lab		Address: Via Chiesa, 89 - Reno Centese			Client: Parish of Sant'Anna - Reno Centese		
TIME	DATE:	OPERATOR	ENVIRONMENTAL TEMPERATURE	ENVIRONMENTAL HUMIDITY			PAGE
9:30	25/09/2014	Cigarini/Salieri	19 C°	76%			1

Data taken at the work site					Humidity analysis				Salt analysis			
No	Surface temp.	Depth of hole	Floor height	Material	Weight empty	Weight damp	Weight dry	Humid %	mg/sample	Sulpha-tes %	Nitra-tes %	Chlori-des %
1	19.2	12	300	brick	1,331	5,644	5,555	2,11	101	< 0,5	< 0,1	0,23
2	19.0	8	150	brick	1,361	4,121	4,031	3,37	101	< 0,5	< 0,1	< 0,2
3	18.5	8	50	brick	1,341	4,720	4,430	9,39	103	1,07	< 0,1	< 0,2
4	18.5	8	300	brick	1,342	3,907	3,831	3,05	102	< 0,5	< 0,1	< 0,2
5	18.5	8	150	brick	1,336	5,596	5,468	3,10	102	< 0,5	< 0,1	< 0,2
6	18.3	8	50	brick	1,316	4,311	4,009	11,21	100	0,63	< 0,1	0,60
7	18.8	8	300	brick	1,339	3,698	3,628	3,06	98	< 0,5	0,19	1,06
8	18.5	15	150	mixed	1,329	2,428	2,395	3,10	106	3,06	0,57	1,41
9	18.3	15	50	mixed	1,323	6,201	5,831	8,21	104	2,34	0,10	0,35



SAN TORPE' ***Scalzi Carmelite Order***



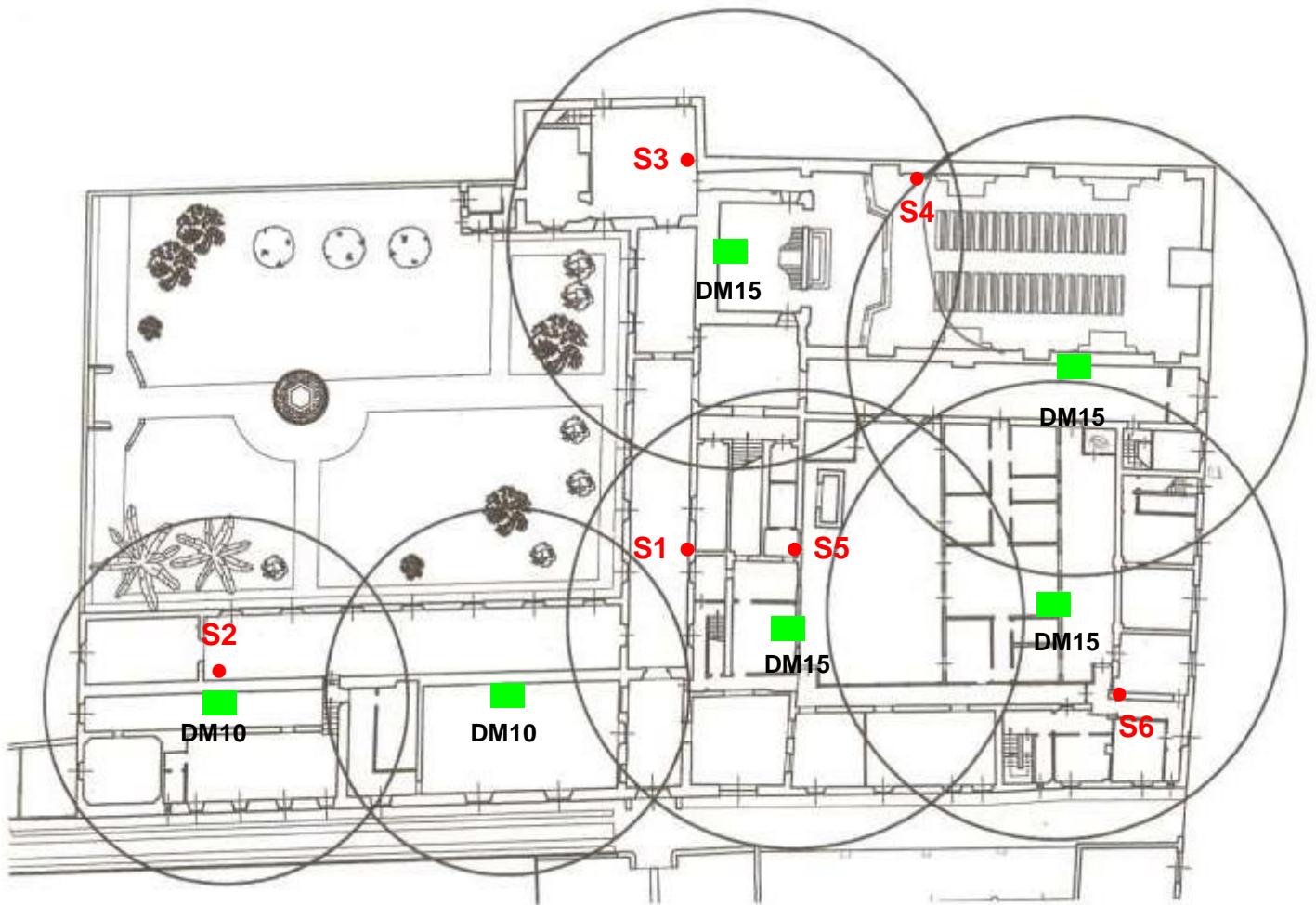


SAN TORPE' ***Scalzi Carmelite Order***





SAN TORPE' Scalzi Carmelite Order





CM method

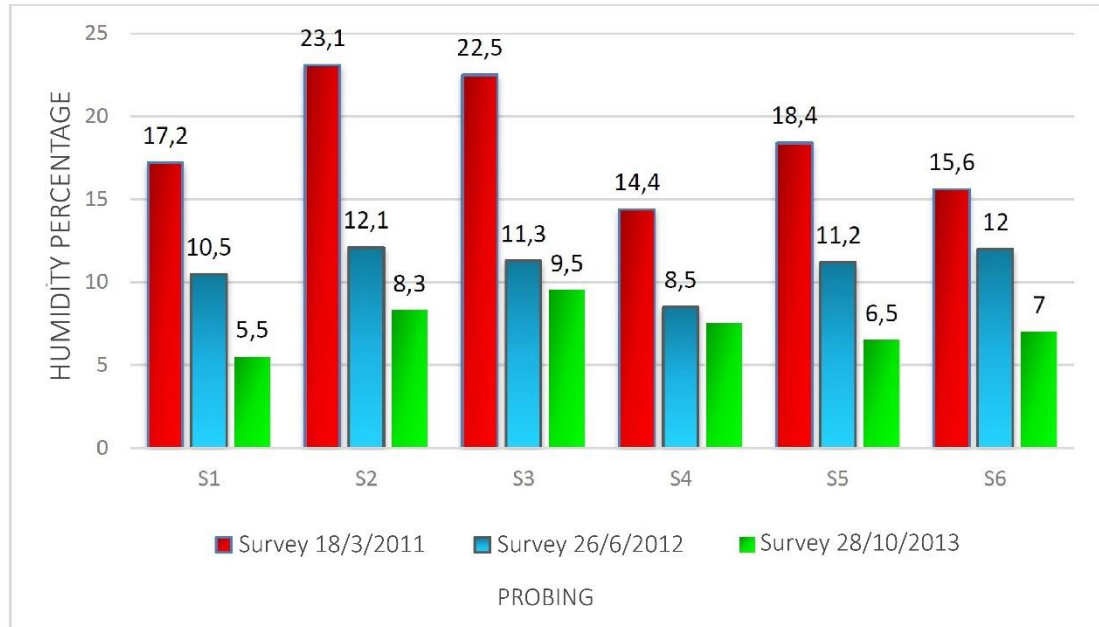


CM Hygrometer technical data

<i>Range of pressure</i>	0÷1,6 bar
<i>Sub division</i>	0,05 bar
<i>Safety Pmax</i>	2 bar
<i>Precision</i>	± 1,6 %
<i>Temperature of use</i>	-10÷80 °C
<i>Manometer body</i>	Steel sheet
<i>Casing resistance</i>	Class IP32



SAN TORPE' Scalzi Carmelite Order



	<i>1st test</i>	<i>2nd test</i>	<i>3rd test</i>	<i>Humidity value variation</i>
<i>Humidity sampled</i>	<i>date:</i> 18/03/2011	<i>date:</i> 26/06/2012	<i>date:</i> 28/10/2013	
S1	17,20	10,50	5,50	-68 %
S2	23,10	12,10	8,30	-64 %
S3	22,50	11,30	9,50	-58 %
S4	14,40	8,50	7,50	-48 %
S5	18,40	11,20	6,50	-65 %
S6	15,60	12,00	7,00	-55 %
AVERAGE REDUCTION				-60 %



SOMMACAMPAGNA

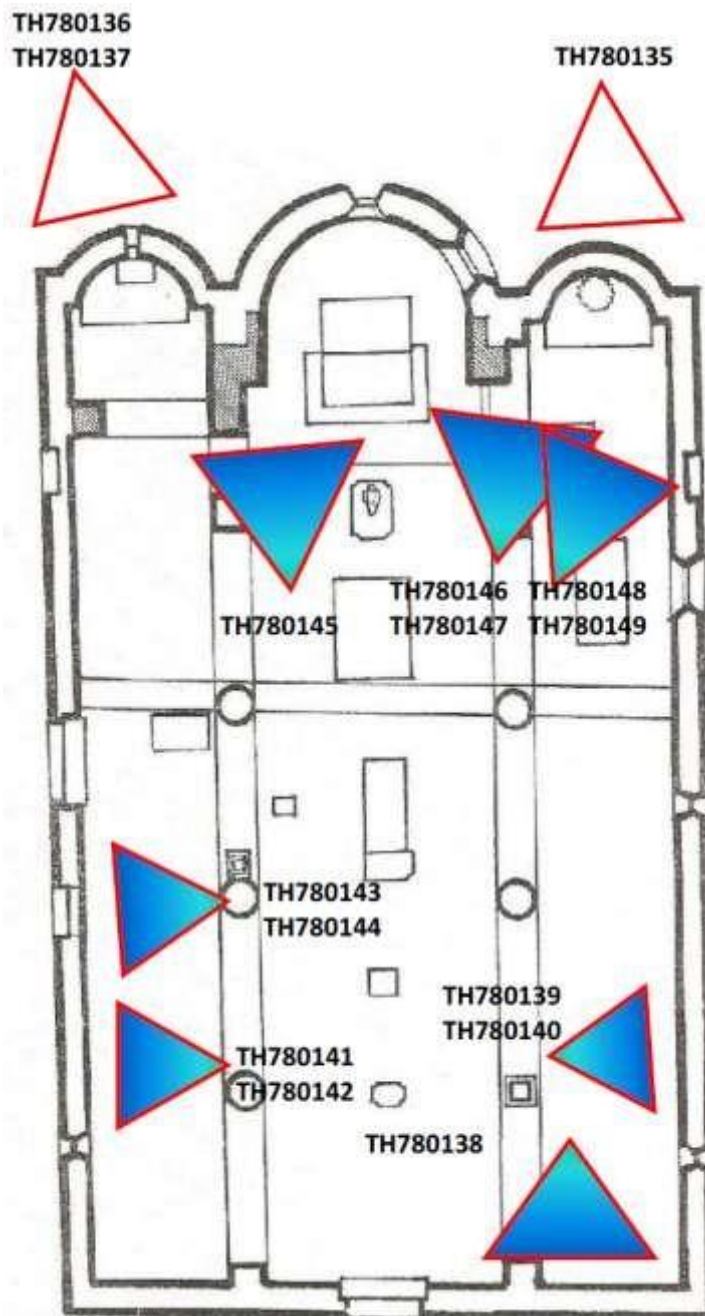
Church of S. Andrea





SOMMACAMPAGNA Church of S. Andrea

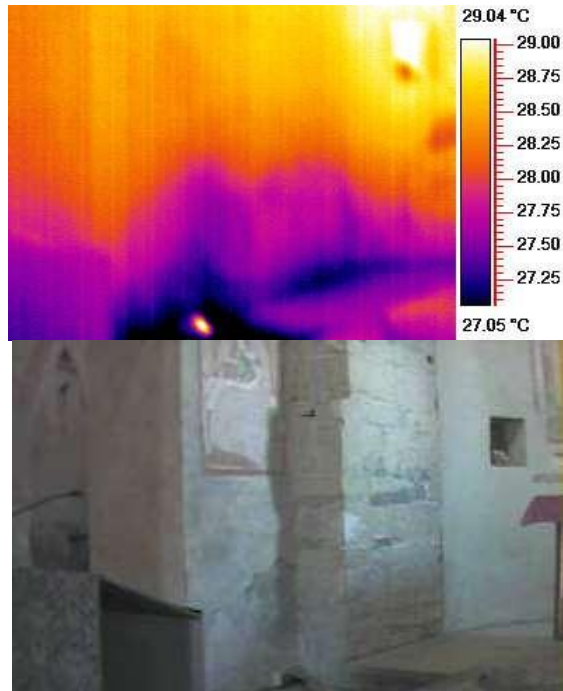
Map of the areas examined





SOMMACAMPAGNA Church of S. Andrea

2013



2014

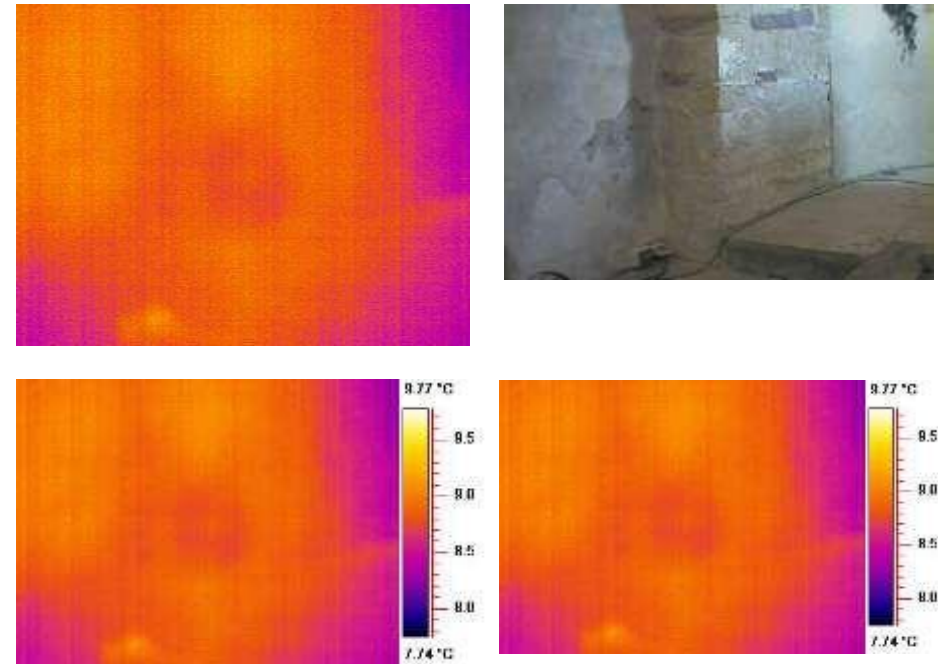


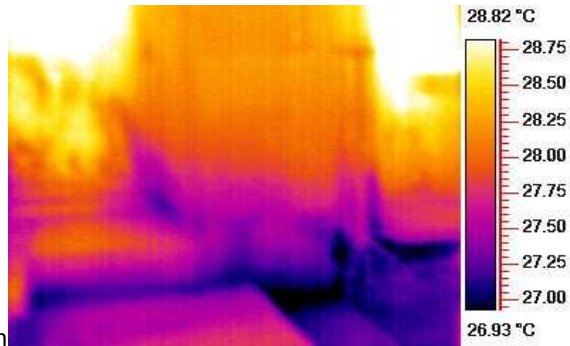
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Date:	07-08-13	Time:	07:27:16
Dimensions:	320x 240 pixel	Emissions:	0.960
Min Temp:	26.59 °C	Max Temp:	30.53 °C
Average Temp.	28.55 °C	Stat. Dev.:	0.74
Notes:	Humidity from capillary action		

Image data: TH780145			
Date:	25-02-14	Time:	16:12:51
Dimensions:	320x 240 pixel	Emissions:	0.960
Min Temp:	8.33 °C	Max Temp:	9.79 °C
Average Temp.	9.32 °C	Stat. Dev.:	0.24
Notes:	No anomalies		



SOMMACAMPAGNA

2013



nollem



2014

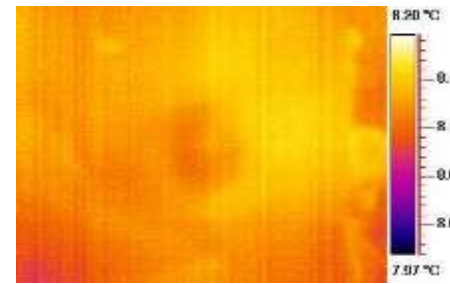
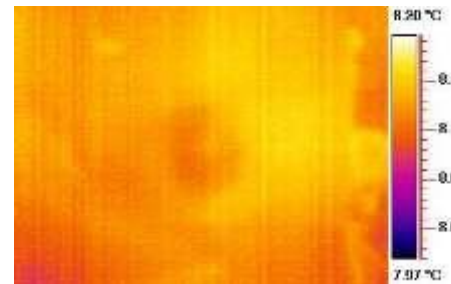
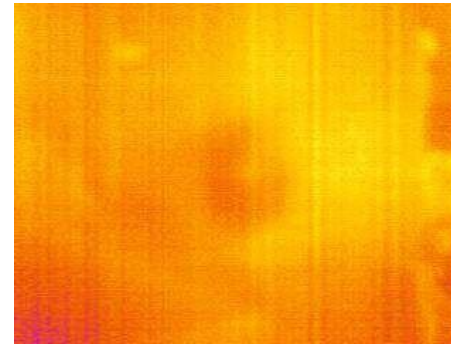


Image data: TH780101

Date:	07-08-13	Time:	07:44:17
Dimensions:	320x 240 pixel	Emissions:	0.960
Min Temp:	26.64 °C	Max Temp:	31.22 °C
Average Temp.	28.50 °C	Stat. Dev.:	0.92
Notes:	Humidity form capillary action		

Image data: TH780147

Date:	25-02-14	Time:	16:14:17
Dimension:	320x 240 pixel	Emissions:	0.960
Min Temp:	8.76 °C	Max Temp:	9.73 °C
Average Temp.	9.36 °C	Stat. Dev.:	0.1
Notes:	No anomalies		