



# TECHNOLOGIES AND APPLICATION METHODS

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# **PROPOSTE TECNOLOGIE MELLONCELLI**

## **TERGOMATIC**

### **IGROLAB**



### **TERGOMATIC**





# *Tergomatic*

**Non-invasive dehumidifier to control rising damp**





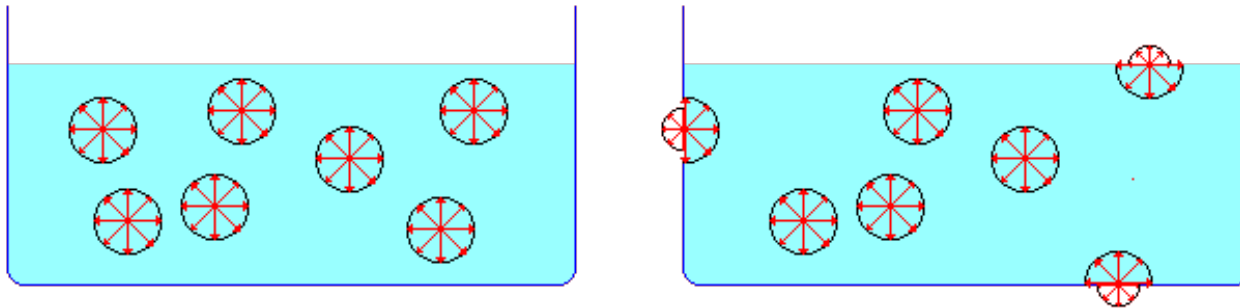
## ***TECHNICAL CONCEPTS ON THE WORKING PRINCIPLE OF THE SYSTEM***

***Some properties that characterise water***

- ***the water molecule is made up of a dipole***
- ***it is a dielectric substance***
- ***it is a diamagnetic substance***
- ***the salts it contains give it the properties to allow electrical current to pass through it by ionic conduction***



# ***PHYSICAL CONDITIONS THAT CAUSE RISING DAMP CAPILLARITY***



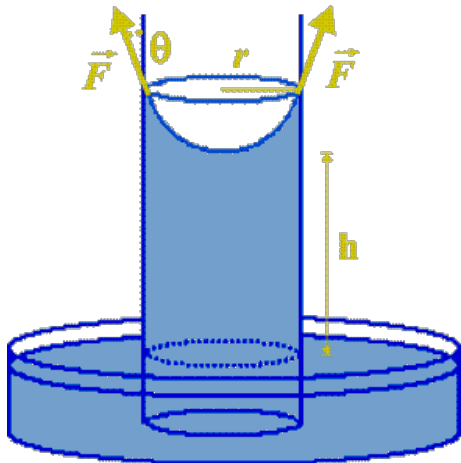
***ADHESIVE FORCES***

***COHESIVE FORCES***

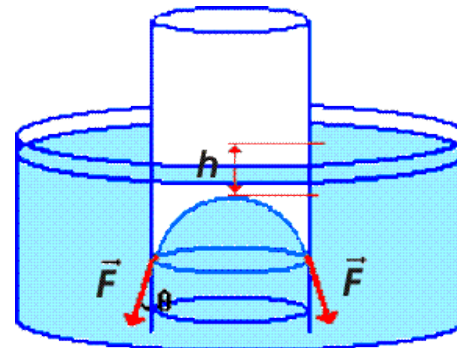
***SURFACE TENSION***



# PHYSICAL CONDITIONS THAT CAUSE RISING DAMP

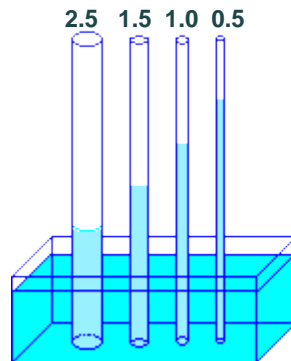


$$\gamma > 0$$



$$\gamma < 0$$

$$h = f(d)$$



diameter of capillary (mm)	height of water (mm)
2.5	25
1.5	38
1.0	52
0.5	66



## ***Tergomatic***

Appropriate circuits enclosed in small equipment to activate emission of an inductor electro-magnetic field which, affecting and interacting with the wall, causes it to have the same induced field that neutralises the potential of the electrical loads in the masonry work, obtaining the following results:



- **stoppage of rising damp**
- **evaporation of water in the wall**
- **surfacing of salts in the masonry work**



# TERGOMATIC

## TECHNICAL DATA



**Model DM8 (action range approx. 8 metres): m. 11 x 11 = m2. 121**

**Model DM10 (action range approx. 10 metres): m. 14 x 14 = m2. 196**

**Model DM15 (action range approx. 15 metres): m. 20 x 20 = m2. 400**


**Model DM20 (action range approx. 20 metres): m. 28 x 28 = m2. 784**





# TERGOMATIC

## *TECHNICAL DATA*

- Power supply 230 V - 50 HZ
- Absorbed power approx. 3 Watt
- Insulation class II according to standards CEI EN 60335-1 (1998)
- Level of protection IP66 according to standards CEI EN 60529 (1997)
- Action range from 10 to 20 metres based on the model
- Marking  certified in compliance with the EEC directive
- Tergomatic technology is considered eco-friendly, totally reversible and non-invasive.

### TÜV Italia Certification

- Safety
- EMF (Emissions- Immunity)
- Electromagnetic Fields Human Exposure Safety



# TERGOMATIC

## **TECHNICAL DATA**

### **Optional:**

- GSM model for remote control of the functioning status of the equipment, with automatic sending of alarm sms in the event of a fault, malfunction or power cut.
- Remote control of environmental micro-climatic parameters, using wireless probes-transmitters located on site and managed in real time, without requiring direct access to the building.
- Buffer battery to assure, in the event of faults and/or prolonged cuts on the electrical line, at least 7 continuous days of autonomous operation of the equipment.
- External power supply connector from solar panel, thereby excluding the electrical mains.

**Tergomatic technology**

**is considered eco-friendly, totally reversible and non-invasive.**



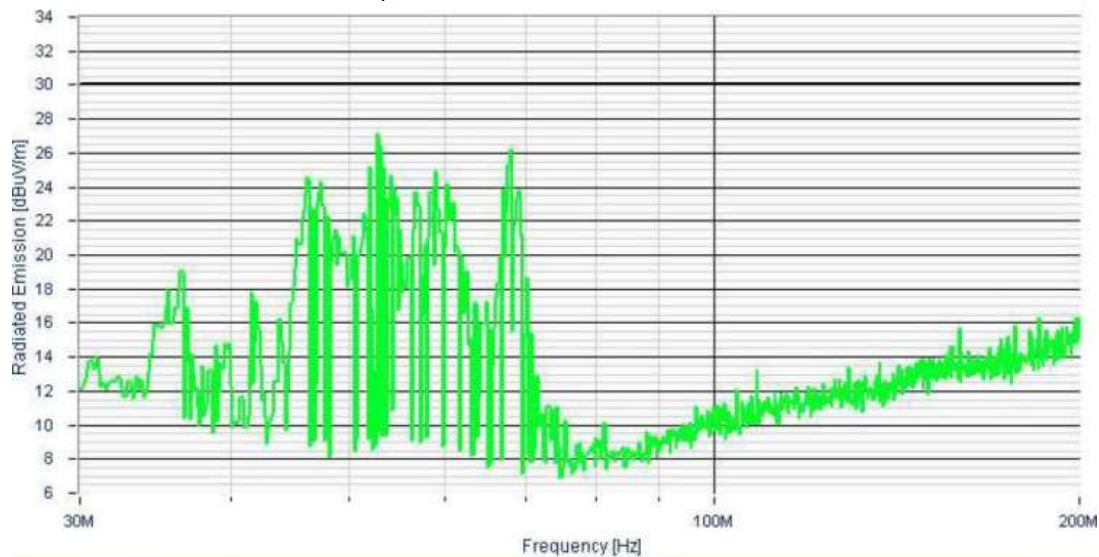
# ELECTROMAGNETIC COMPATIBILITY



## MEASUREMENT OF RADIATED EMISSIONS

The scope of the test is to ensure electromagnetic compatibility of the equipment with the surrounding environment, measuring its electromagnetic field radiated to radio frequencies.

Radiated emission - EN 55011 - Group 1 Class B



Measurement Distance: 10 m

Antenna Orientation: Vertical



## COMPARITIVE TABLE

Values indicated in the electrical and magnetic fields generated by certain appliances at various distances from the body in relation to the emission of Tergomatic by S.K.M.

EXAMPLES OF INTENSITY OF THE FIELD ON VARYING THE DISTANCE (values of B in microTesla  $\mu\text{T}$ )

APPLIANCE	BEHIND	10cm	20cm	30cm	THE VALUE IS GREATER THAN	
<b>TERGOMATIC</b> by S.K.M.		0,8	0,3	0,14		
Fridge	0,5 ÷ 1,7	1,5	1	0,25	2	times
Stereo	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
Incandescent light	60	3,8	0,85	0,27	5	times
Washer 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
Razer	50 ÷ 1300	20	5	1,7	25	times
Hairdryer	40 ÷ 100	40	5	1,5	50	times

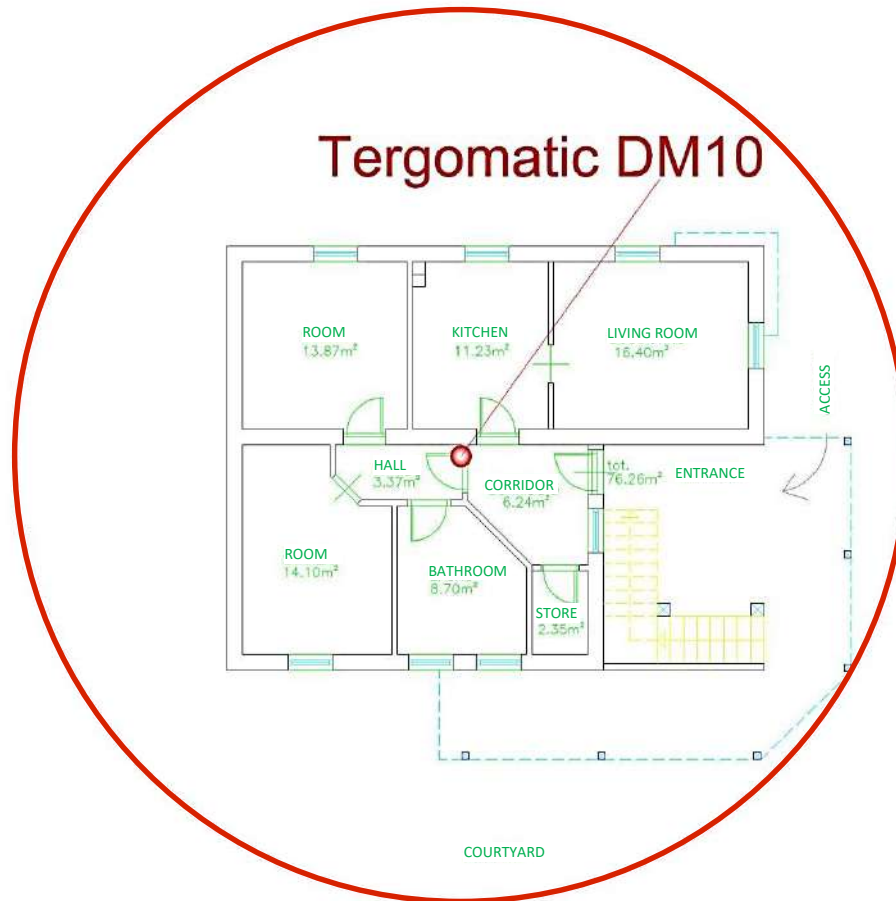


# ***DESIGN AND EXECUTION OF WORK***





## Layout of the building





# ***DESIGN AND EXECUTION OF WORK***



## ***CONVENTO GESUATI - FERRARA (FE)***

Inspections by: **MELLONCELLI srl**

Date: **28.04.2015**

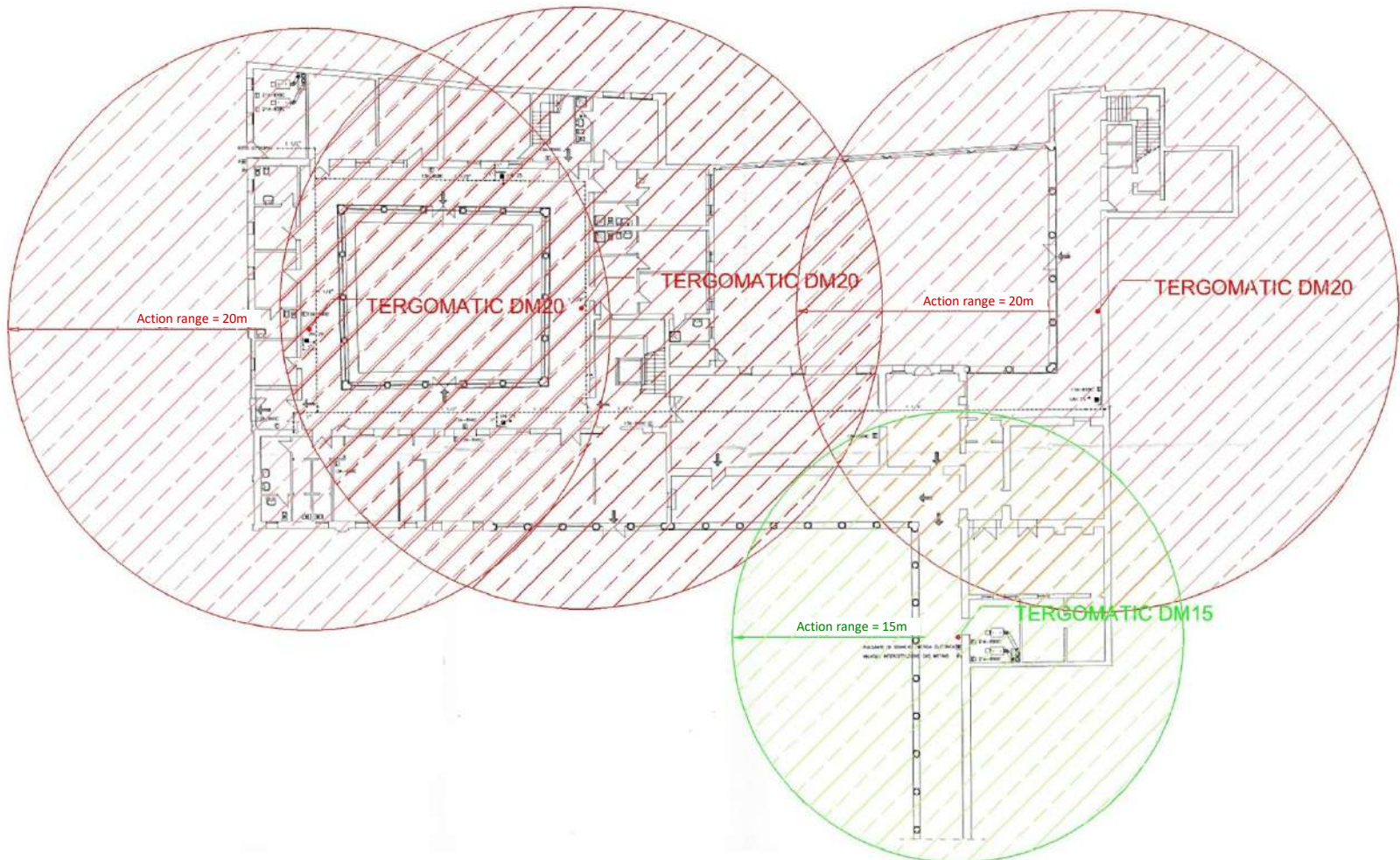






# DESIGN AND EXECUTION OF WORK

Example of equipment installation and relevant action fields  
(action range of 15 to 20 metres based on the model)





# ***PRE-DIAGNOSIS AND DIAGNOSIS APPLIED TO TECHNOLOGIES***



## ***PRE-DIAGNOSIS AND DIAGNOSIS***



HygroLAB and MobileLAB:  
for diagnostics



**«FULL» SALTS ANALYSIS**

[SEE EXAMPLE >](#)



# SUCCESSFUL CASES



*State Archive  
Modena*



*San Giorgio Cathedral*

*FERRARA (FE)*



*S. Paolo Maggiore Basilica  
BOLOGNA*



***Modena State Archive***



## *Modena State Archive*



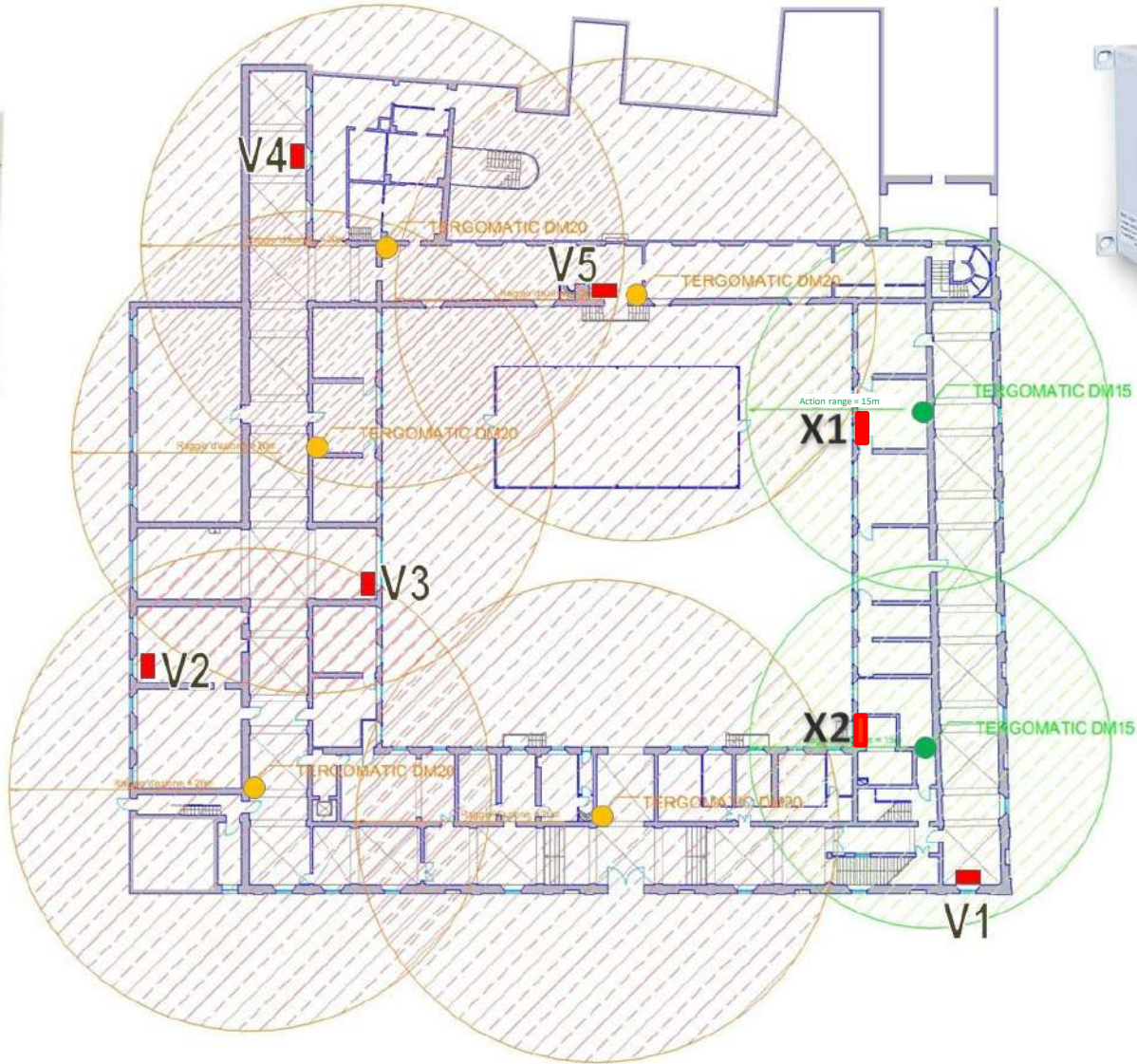
*External wall*



## *Modena State Archive*



*Rising damp (2009)*



**Tergomatic  
DM15 (2009)**

**TERGOMATIC  
DM20 (2015)**

**Rising damp**

**Idromatic  
(Xn) (2009)  
(Vn) (2015)**

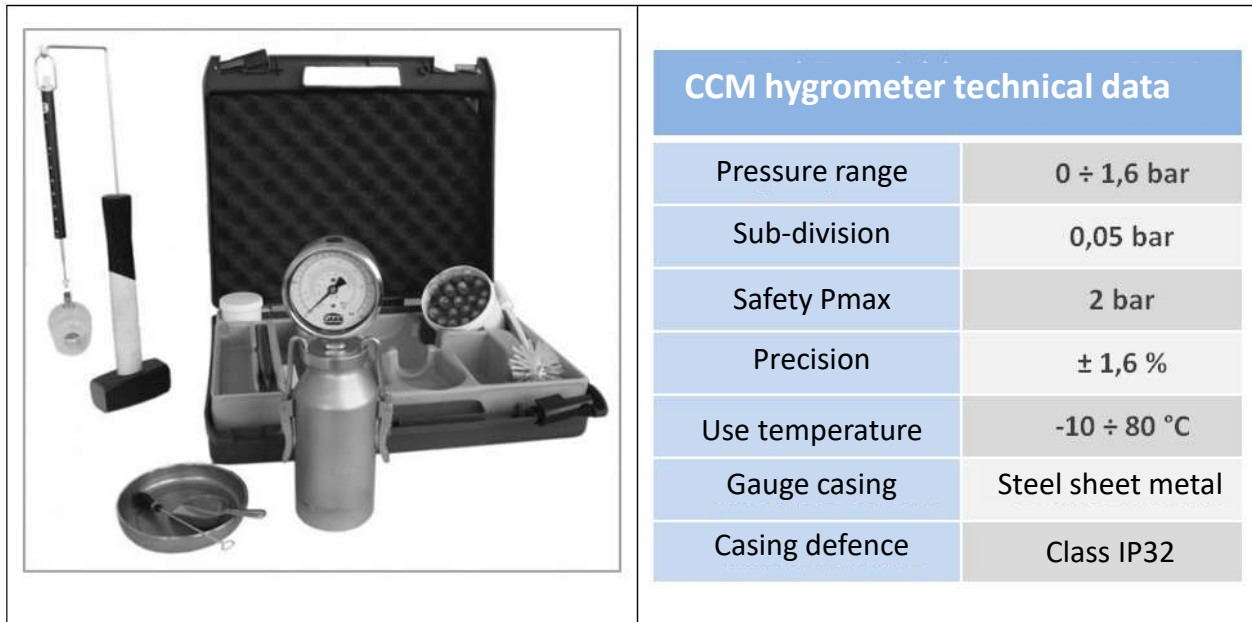




## TOOL USED

# CALCIUM CARBIDE

A CCM GERÄT hydrometer was used for testing, similar to that represented.

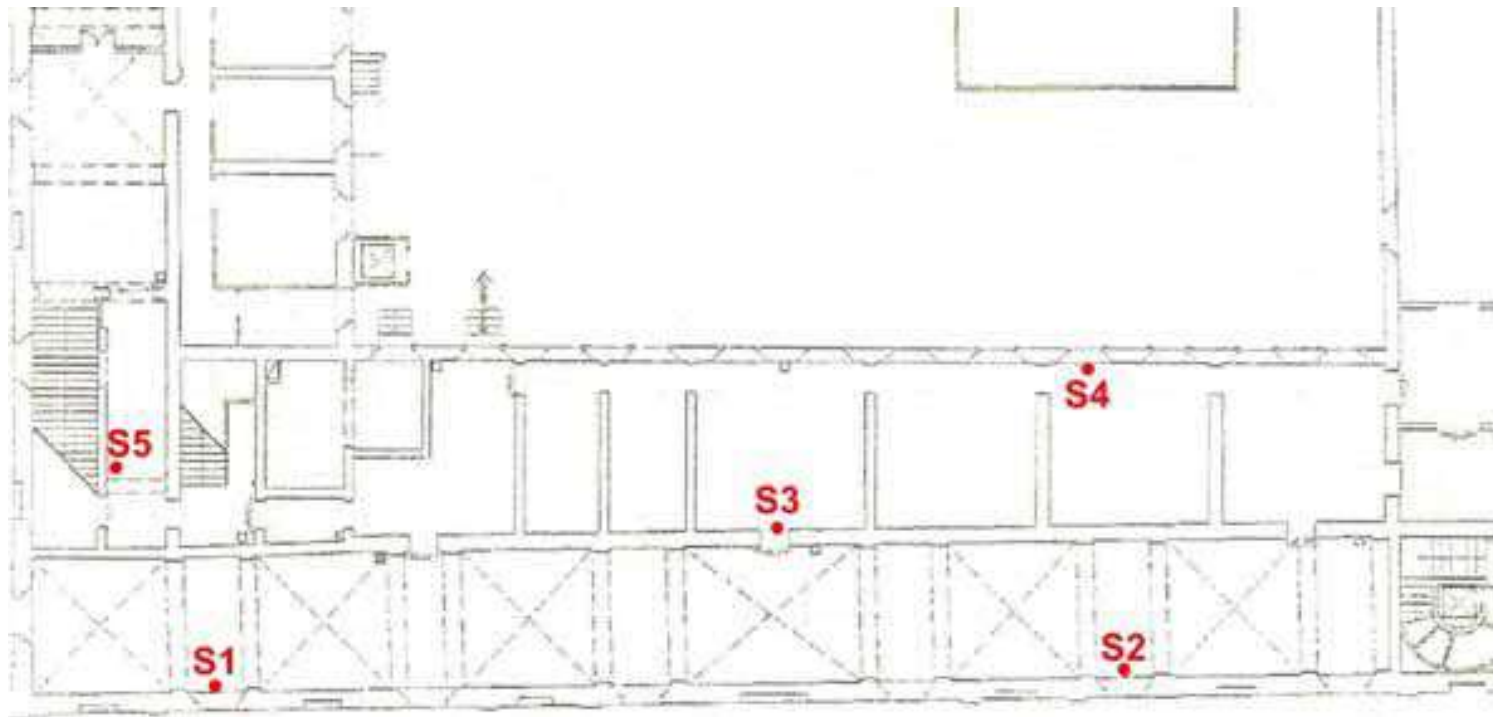


The instrumental scale is calibrated with reference to an environmental execution of testing temperature equal to 20 °C (corresponding to 293 K); however changes in temperature of ± 10 °C are permitted, a range within which the error caused in the measurement can be considered negligible.



## DATA PROCESSING (2009)

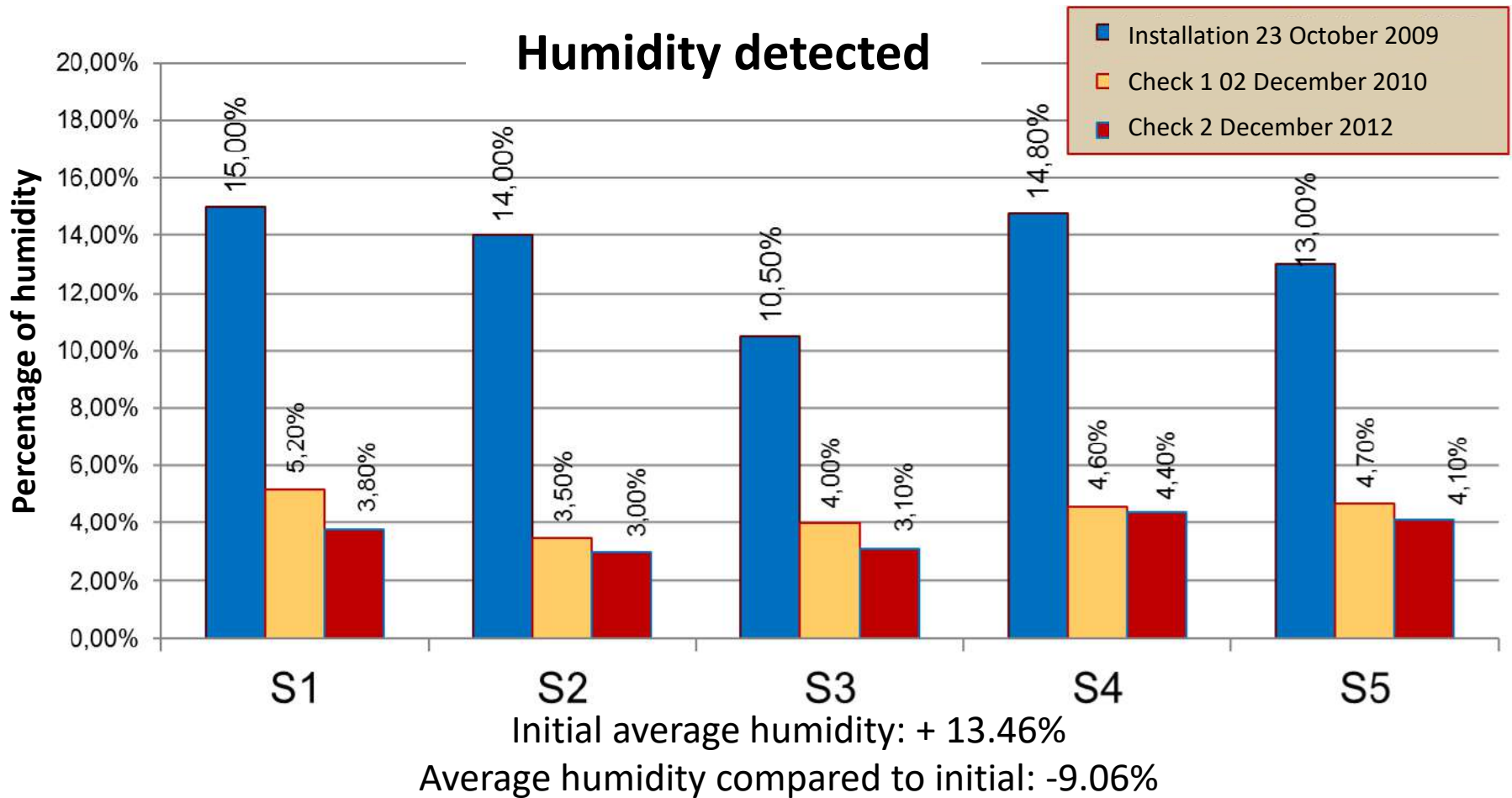
The tests were conducted over a total of 5 sample points appropriately chosen in agreement with the client and outlined in the layout (probes S1÷S5).





# DATA PROCESSING (2009-2012)

## Results of tests





# DATA PROCESSING (2015)

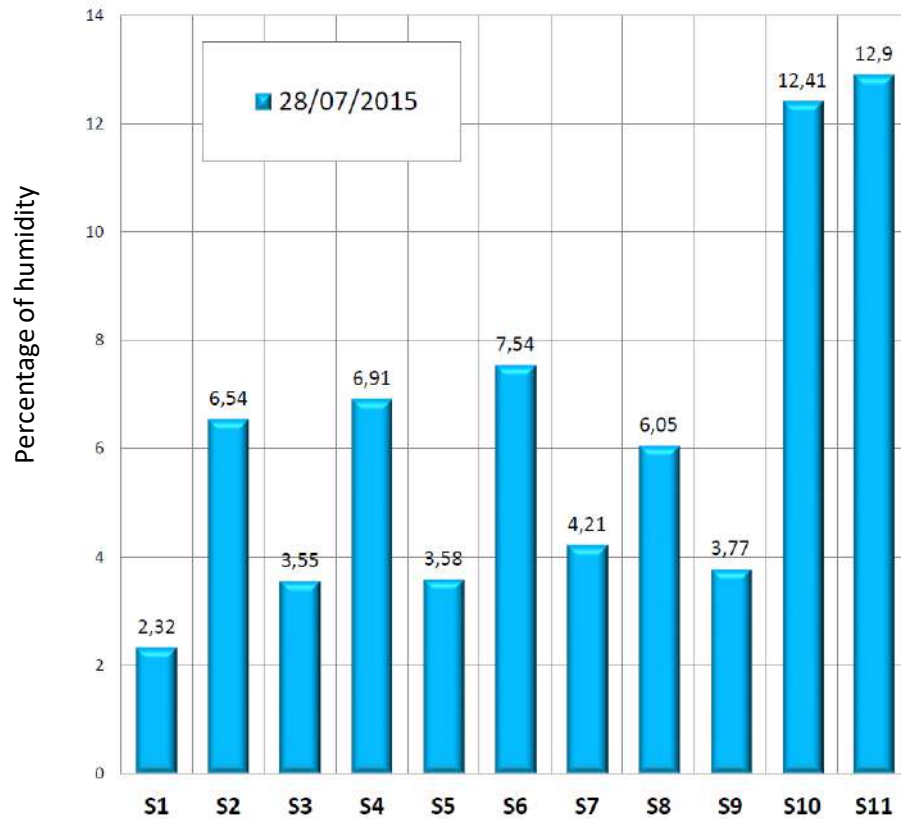
The tests were conducted over a total of 5 sample points appropriately chosen in agreement with the committee and outlined in the layout (probes S1÷S5).





# DATA PROCESSING (2015)

## Results of tests



Sample data						Humidity		Soluble salts			
NAME	Date	T surface	Material	Depth	Measurement	Surface humidity	Water content	% Sulphates	% Chlorides	% Nitrates	Specific conductivity
S1	27/07/15	27.9	brick	5	60	9.1	2.32	0.1 ±0.0	0.4 ±0.1	1.0 ±0.2	71.68
S2	27/07/15	27.8	brick	5	10	12.2	6.54	0.1 ±0.0	1.0 ±0.2	0.9 ±0.2	87.74
S3	27/07/15	26.7	brick	5	60	9.7	3.55	under 0.10	1.4 ±0.3	0.9 ±0.2	89.52
S4	27/07/15	26.6	brick	4	10	8.7	6.91	2.0 ±0.1	0.9 ±0.2	0.6 ±0.1	100.00
S5	27/07/15	27.0	brick	4	60	13.7	3.58	5.1 ±0.3	0.2 ±0.0	0.2 ±0.0	118.10
S6	27/07/15	26.4	brick	4	10	8.6	7.54	0.2 ±0.0	0.3 ±0.1	under 0.01	64.08
S7	27/07/15	27.6	brick	4	60	2.5	4.21	under 0.10	0.3 ±0.1	under 0.01	NaN
S8	27/07/15	27.5	brick	4	10	2.0	6.05	under 0.10	under 0.10	under 0.01	47.06
S9	27/07/15	26.6	mixed	4	160	5.8	3.77	2.4 ±0.1	under 0.10	under 0.01	76.70
S10	27/07/15	26.0	mixed	4	60	13.9	12.41	7.4 ±0.4	0.3 ±0.1	0.6 ±0.1	177.50
S11	27/07/15	25.4	mixed	4	10	12.3	12.90	5.3 ±0.3	under 0.09	under 0.01	103.67



## ***DESIGN AND EXECUTION OF WORK***



***S. GIORGIO - FERRARA CATHEDRAL (FE)***



## ***PHOTOGRAPHIC DOCUMENTATION***



San Giorgio Cathedral





## PHOTOGRAPHIC DOCUMENTATION



Evident rising damp





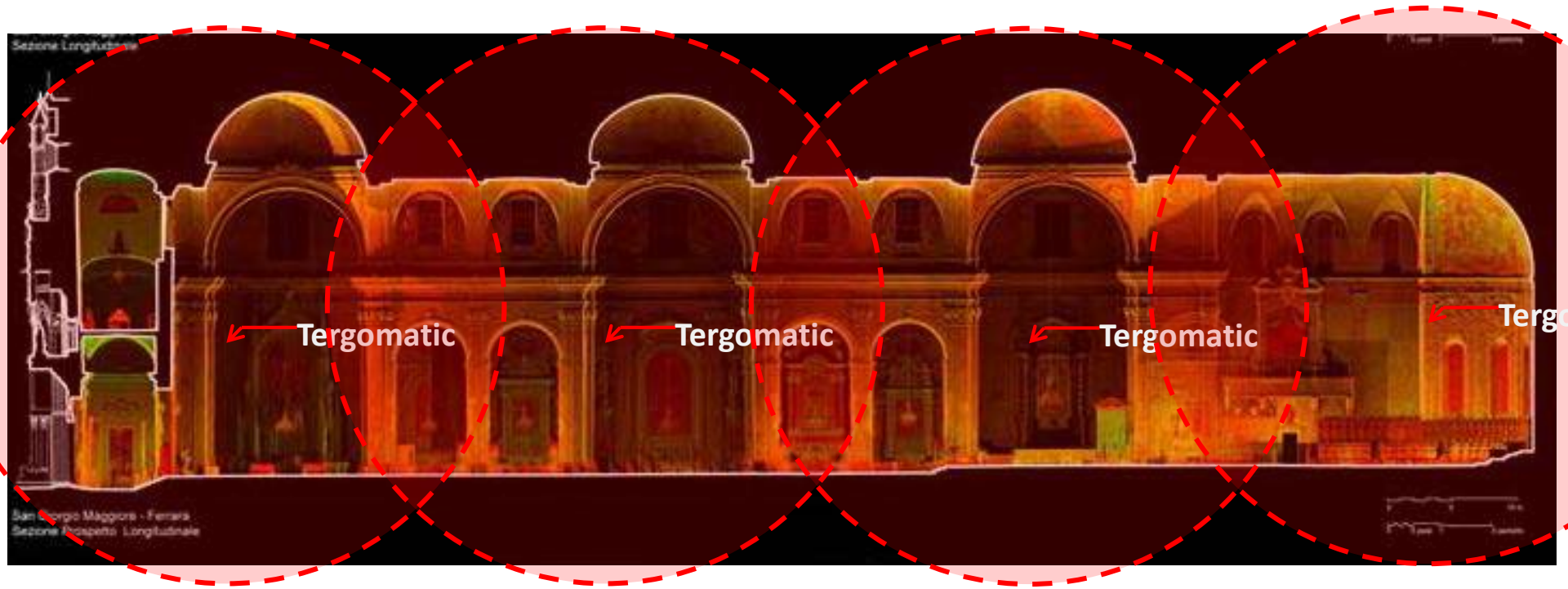


## ***PHOTOGRAPHIC DOCUMENTATION***



Deterioration of plaster with obvious rising damp







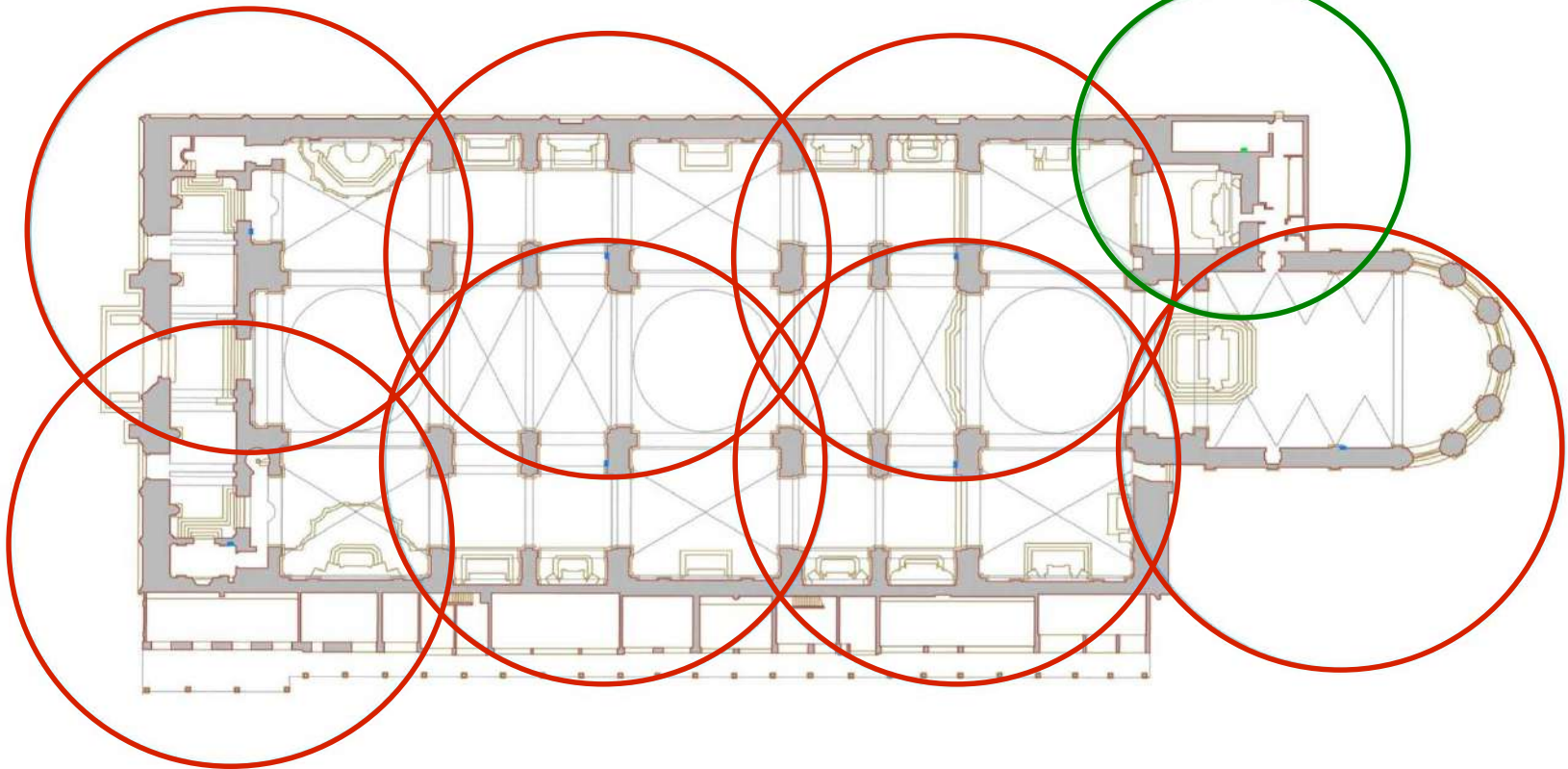
## Church Layout



**Tergomatic  
DM20**



**Tergomatic  
DM15**





# DATA PROCESSING (28-04-2015)

## Results of tests

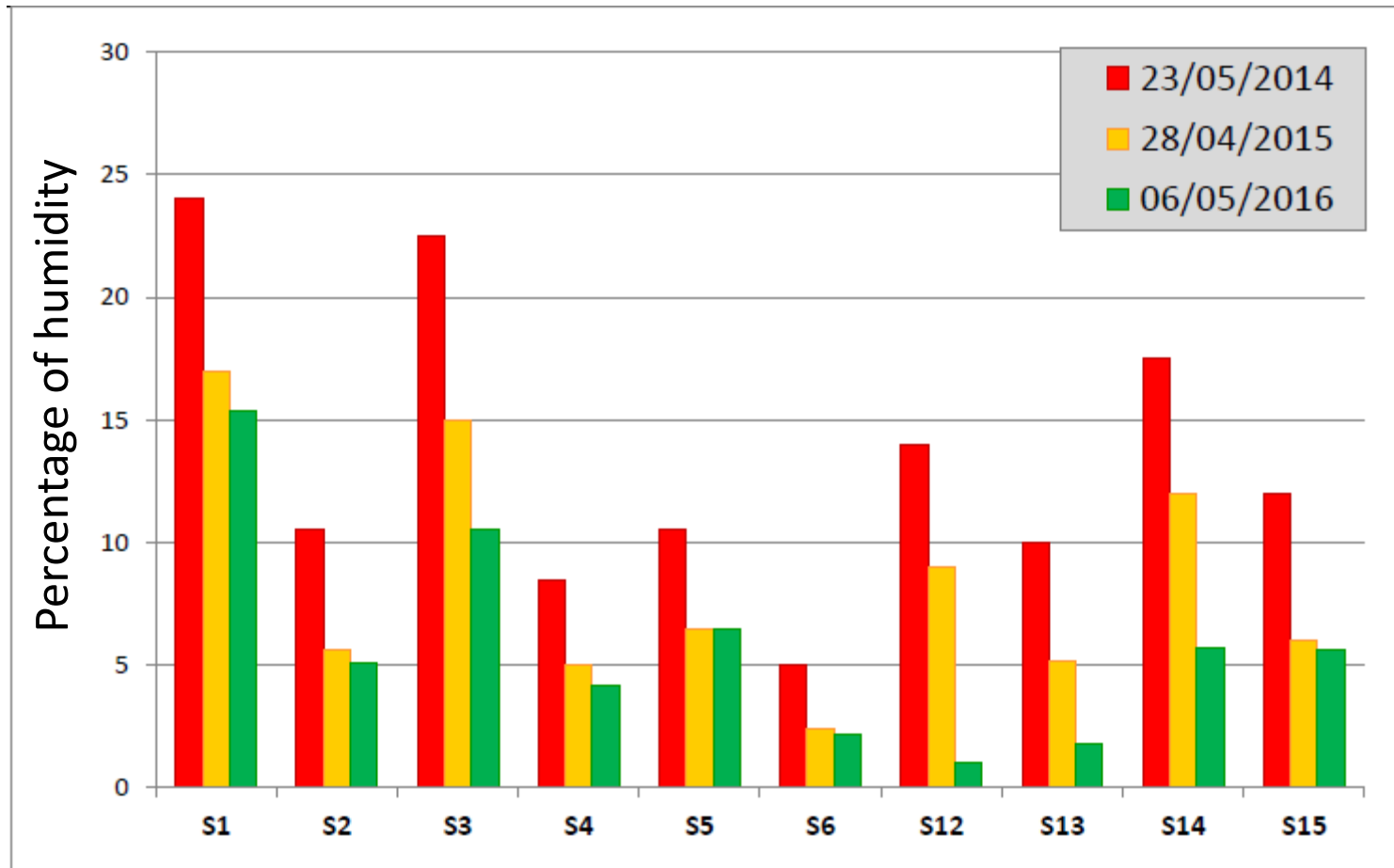
Results of analyses carried out with the carbide method





# DATA PROCESSING (06-05-2016)

## GRAPH OF DETECTED HUMIDITY





# DATA PROCESSING (06-05-2016)

## Summary table

Probing	Inspection on 23-05-2014	Inspection on 28-04-2015	Inspection on 06-05-2016	Change in humidity values
S1	24,0%	17,0%	15,4%	-35,83%
S2	10,5%	5,6%	5,1%	-51,43%
S3	22,5%	15,0%	10,5%	-53,33%
S4	8,5%	5,0%	4,2%	-50,59%
S5	10,5%	6,5%	6,5%	-38,10%
S6	5,0%	2,4%	2,2%	-56,00%
S12	14,0%	9,0%	1%	-92,86%
S13	10,0%	5,2%	1,8%	-82,00%
S14	17,5%	12,0%	5,7%	-67,43%
S15	12,0%	6,0%	5,6%	-53,33%



# ***DESIGN AND EXECUTION OF WORK***



***Project:***  
***San Giovanni Battista Church***  
***RAVARINO (MO)***

Inspections by:  
**Cigarini - Salieri**  
**MELLONCELLI srl**

Date: **28/01/2016**



## ***PHOTOGRAPHIC DOCUMENTATION***



San Giovanni Battista Church







## PHOTOGRAPHIC DOCUMENTATION

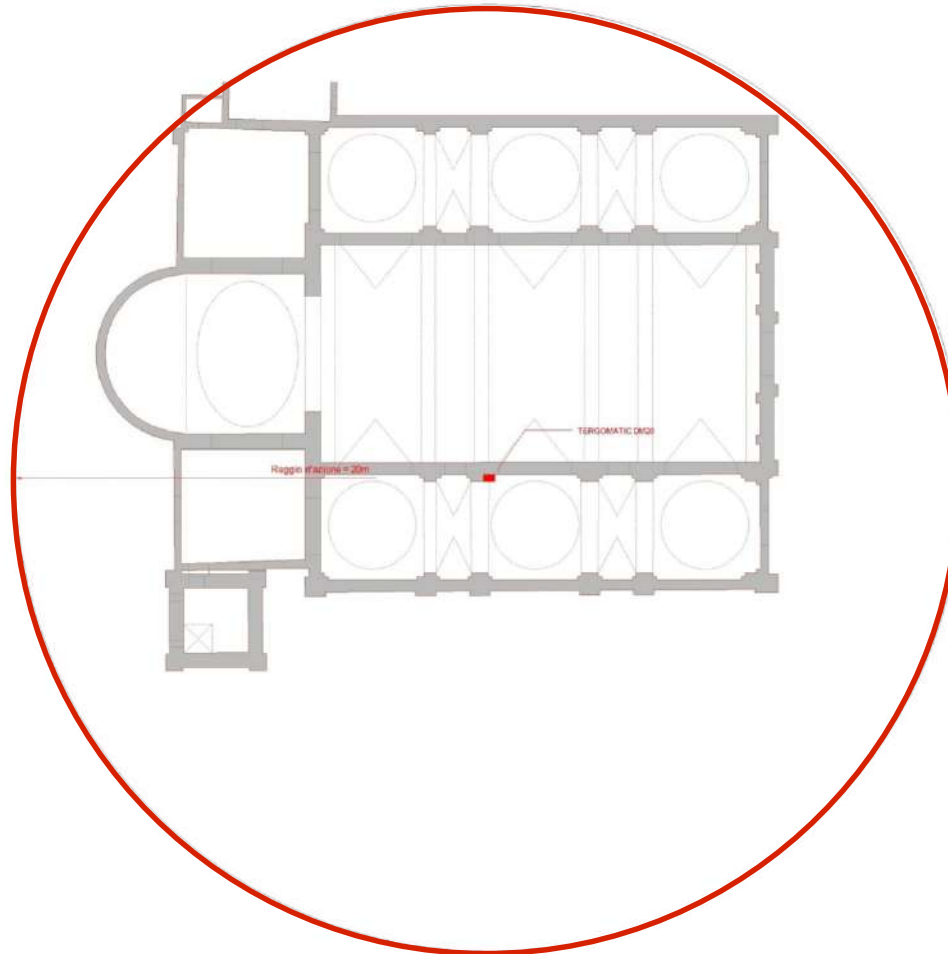


Evident rising damp





## Church Layout

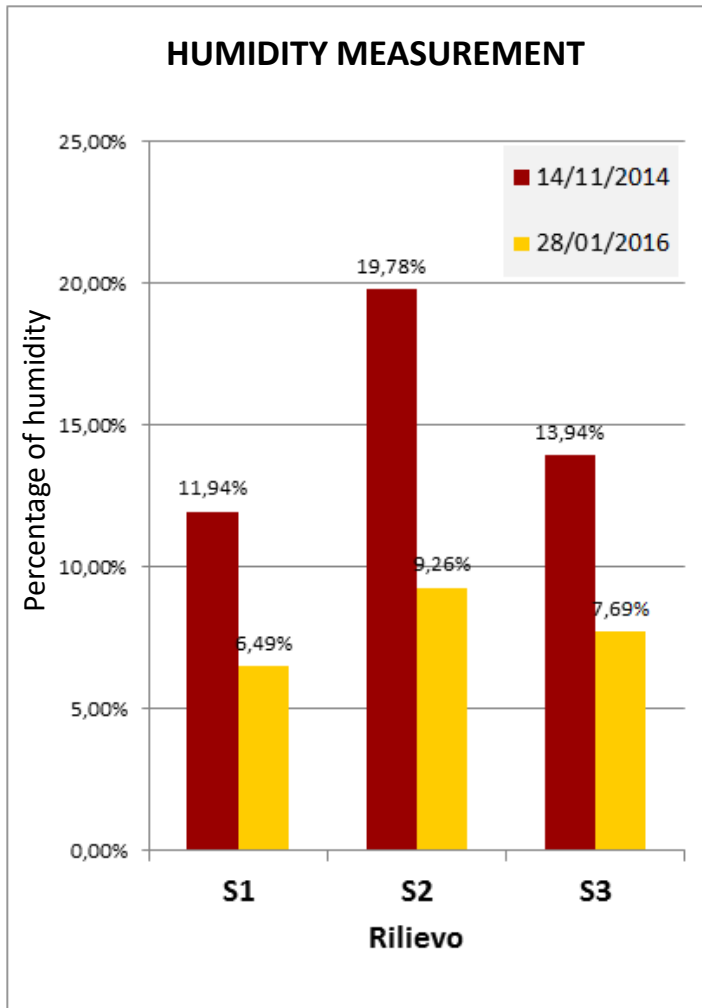


**Tergomatic  
DM20**



# DATA PROCESSING (28-01-2016)

## GRAPH OF DETECTED HUMIDITY




Probing	Inspection on 14-11-2014	Inspection on 28-01-2016	Change in humidity values
S1	11,94%	6,49%	-45,68%
S2	19,78%	9,26%	-53,17%
S3	13,94%	7,69%	-44,83%



# DATA PROCESSING (28-01-2016)

## Summary table

				Construction site: <b>Ravarino - Parrocchia S. Giovanni Battista</b>				Contacts						
<b>mobile lab technical services</b>				Address: <b>Via Roma - RAVARINO (MO)</b>				Client: <b>Parrocchia S. Giovanni Battista</b>						
TIME	DATE	OPERATOR								PAGE				
11:30	28/01/2016	Cigarini-Salieri								1				
Data found on construction site					Humidity analysis				Hum.% on 14-11-2014	Total Salts		Quantity Salts		
No.	T° surf.	Depth hole	M floor.	Material	Weight no load	Weight damp	Weight dry	Hum. %		H2O	Solut.	Sulph %	Nitr. . %	Chlor. %
1		7	20	brick	1,325	8,155	7,739	6,49	11,94					
2		7	20	brick	1,329	8,041	7,472	9,26	19,78					
3		7	20	brick	1,338	6,071	5,733	7,69	13,94					



## ***PHOTOGRAPHIC DOCUMENTATION***



San Lorenzo Parish



## ***PHOTOGRAPHIC DOCUMENTATION***



Evident rising damp

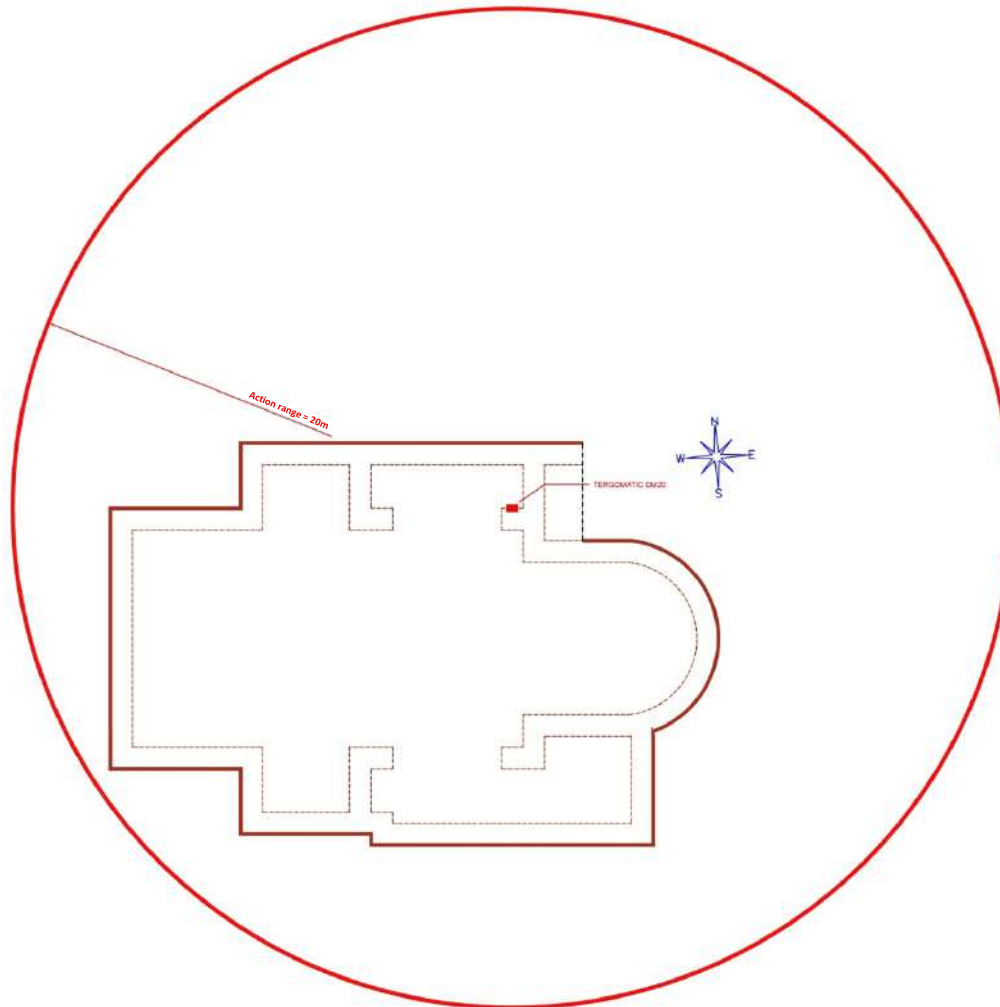




## Church Layout



**Tergomatic  
DM20**





# DATA PROCESSING (26-02-2016)

## Results of tests

Results of analyses carried out with the carbide method

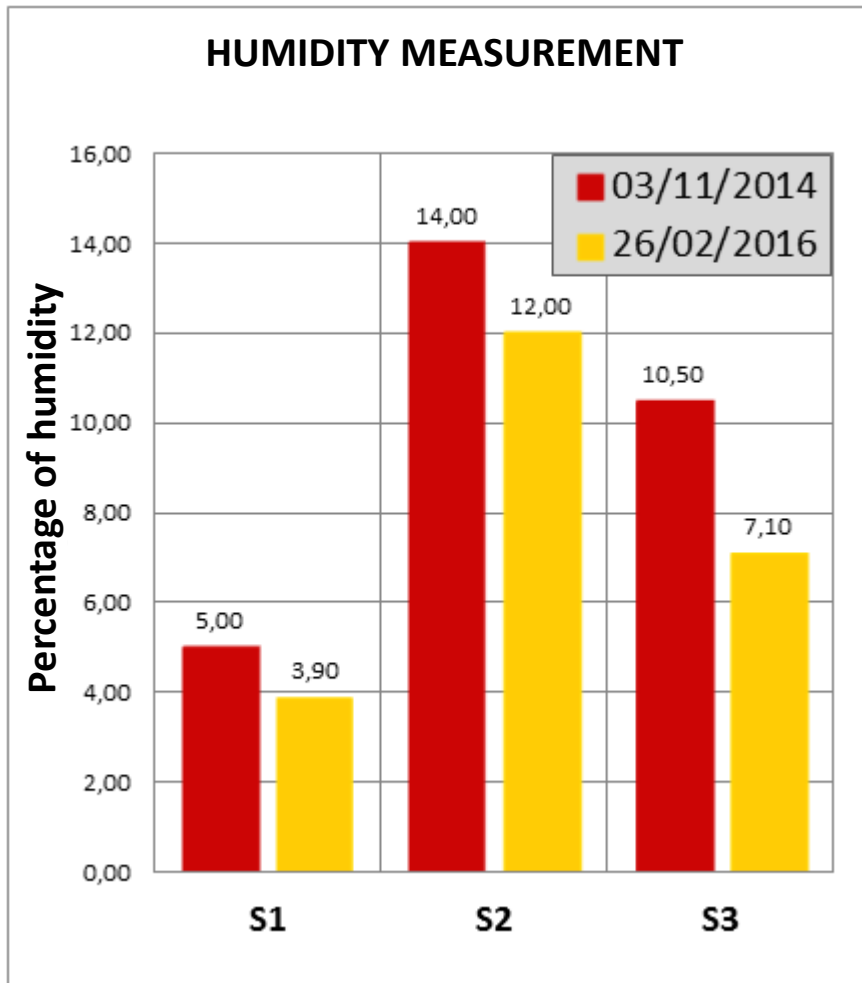






# DATA PROCESSING (26-02-2016)

## GRAPH OF DETECTED HUMIDITY



Probing	Inspection on 03-11-2014	Inspection on 26-02-2016	Change in humidity values
S1	5%	3,9%	-22,00%
S2	14%	12%	-14,29%
S3	10,5%	7,1%	-32,38%



# ***DESIGN AND EXECUTION OF WORK***



***Project:***  
***San Paolo Maggiore Basilica***  
***BOLOGNA***

Inspections by:  
**Cigarini - Salieri**  
**MELLONCELLI srl**

Date: **27/05/2015**



## ***PHOTOGRAPHIC DOCUMENTATION***



San Paolo Maggiore Basilica





## ***PHOTOGRAPHIC DOCUMENTATION***



Evident rising damp





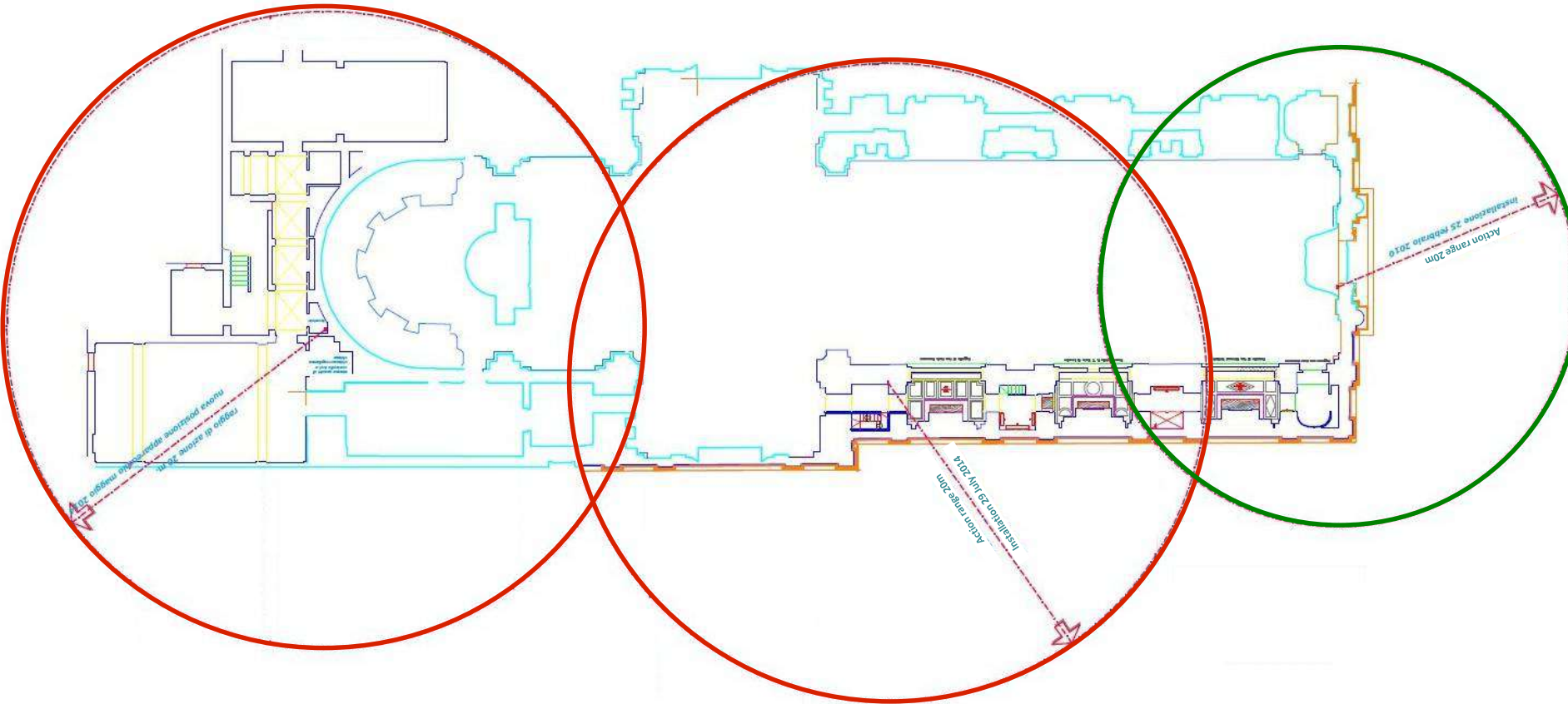
# Church Layout



**Tergomatic  
DM20 2015**



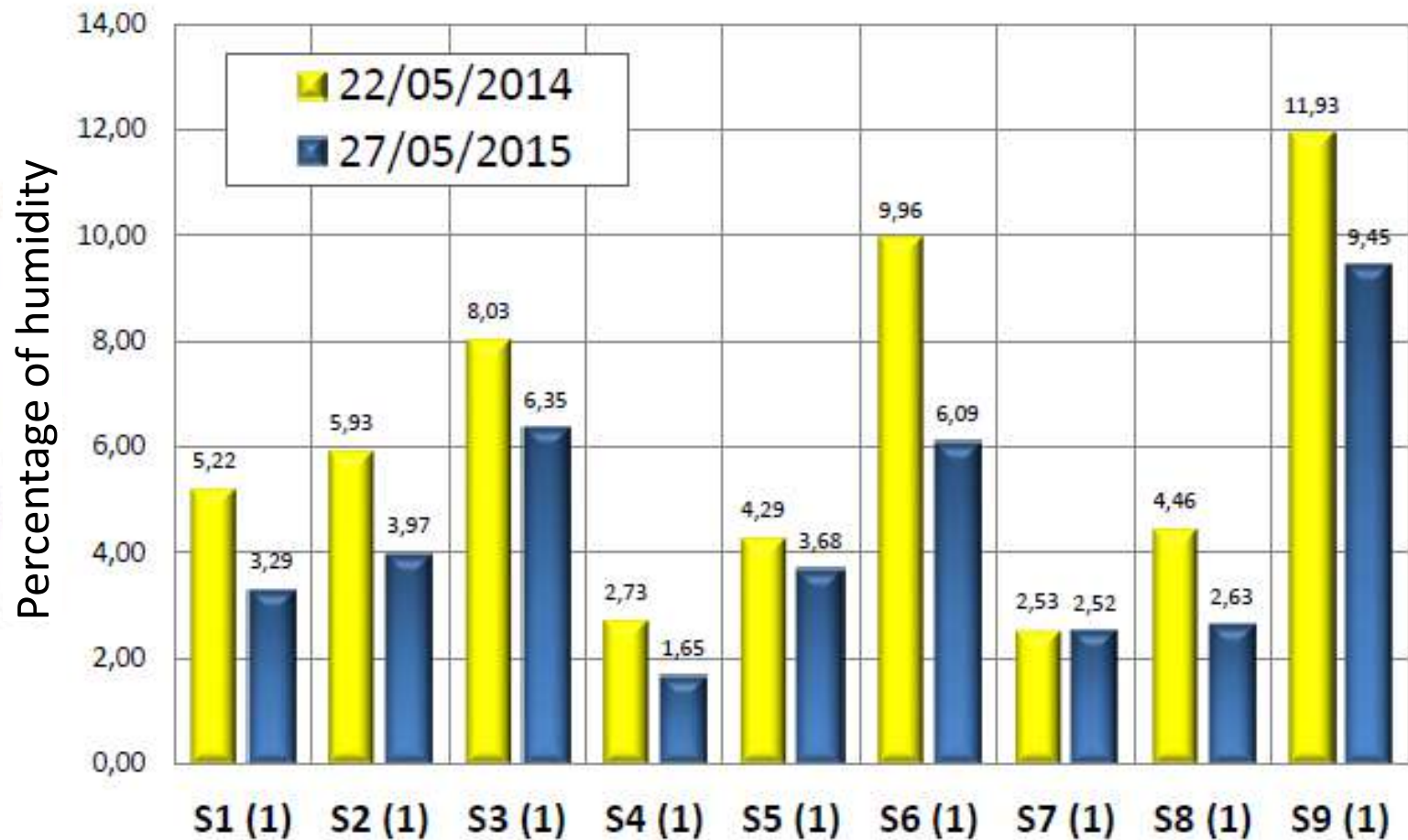
**Tergomatic  
DM15 2009**





## Graph of detected humidity

### HUMIDITY MEASUREMENT (1)





## Comparison of humidity values

<b>Probing</b>	<b>Inspection on 22-05-2014</b>	<b>Inspection on 27-05-2015</b>	<b>Change in humidity values</b>
S1 (1)	5,22%	3,29%	-36,97%
S2 (1)	5,93%	3,97%	-33,05%
S3 (1)	8,03%	6,35%	-20,92%
S4 (1)	2,73%	1,65%	-39,56%
S5 (1)	4,29%	3,68%	-14,22%
S6 (1)	9,96%	6,09%	-38,86%
S7 (1)	2,53%	2,52%	-0,40%
S8 (1)	4,46%	2,63%	-41,03%
S9 (1)	11,93%	9,45%	-20,79%



**MELLONCELLI MODULARITY**

**ANALYSIS+TECHNOLOGIES**

***CUSTOMER LOYALTY AND A SINGLE***

***INTERLOCUTOR FOR EVERY PROBLEM!!!!!!***