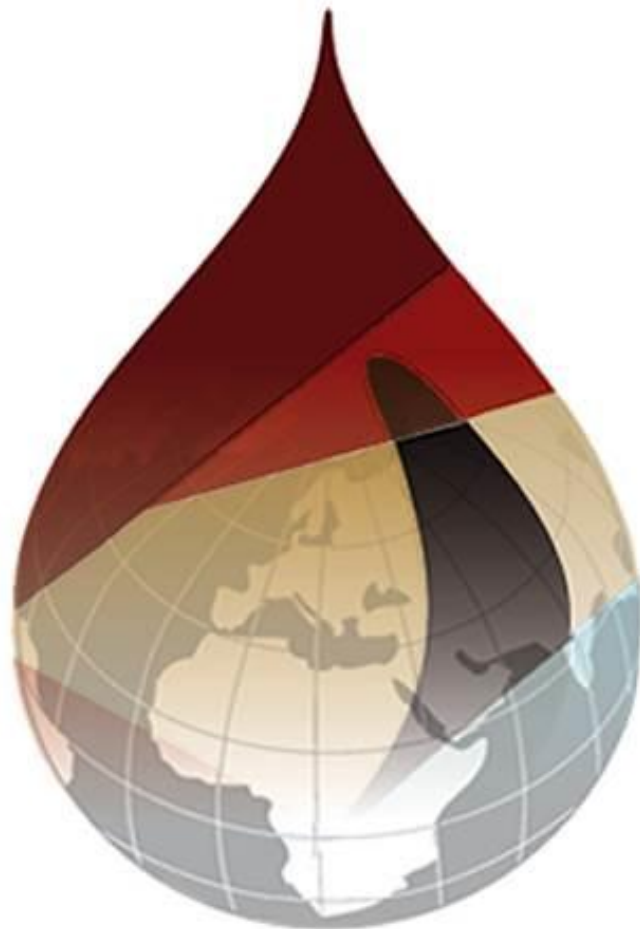


HYGROLAB

FOR DIAGNOSTICS



 **Melloncelli**
Technology for the art since 1843

Environmental and rising damp dehumidifying

Every historic building consists of " UNIQUE " materials and is therefore impossible to standardize procedures for intervention.

HYGROLAB



BUILDINGS TO BE RESTORED



A scientific approach to the problem so you can get the best possible outcome for each individual case!

INTEGRATED TECHNOLOGIES ***within HygroLAB***



QUANTITATIVE ANALYSIS
OF NITRATES, SULPHATE
AND CHLORIDES



HUMIDITY
MEASUREMENT USING
WEIGHT METHOD



THERMO-
HYGROMETER



LASER
THERMOMETER



HYGROMETER



MEASUREMENT OF
TOTAL SOLUBLE
SALTS and PH



SOFTWARE TO
CARRY OUT REPORTS



SAMPLES FOR
LABORATORY
ANALYSIS

The measurements must be repeated BEFORE and AFTER the restoration work, the analyzes carried out thanks to HYGROLAB let you know the effectiveness of the work performed .

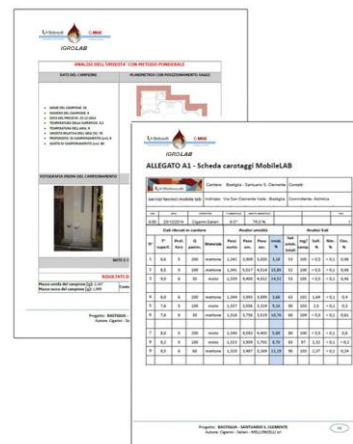
SAMPLING

SAMPLE DATA	LAYOUT WITH PROBE POSITIONING
<ul style="list-style-type: none"> SAMPLE NAME: S1 SAMPLE DATA: 17.07.2014 SURFACE TEMPERATURE: 19.2 °C AIR TEMPERATURE: 21.4 °C RELATIVE HUMIDITY OF THE AIR [%]: 63.9 SAMPLING DEPTH [cm]: 8 SAMPLING MEASUREMENT [cm]: 200 	
PHOTOGRAPH BEFORE SAMPLING	PHOTOGRAPH AFTER SAMPLING

ANALYSIS OF HUMIDITY WITH WEIGHT METHOD	Sample damp weight [g]: 2.667 Sample dry weight [g]: 2.582	Water content in % on dry base: 3.292
MEASUREMENT OF TOTAL SOLUBLE SALTS - CONDUCTIVITY METHOD	Sample weight [mg]: 100 Water quantity [mL]: 100 Water conductivity [μ S/cm]: 0	Calculated conductivity according to UNI11087-2003 [μS/cm]: 386
QUANTITATIVE ANALYSIS OF SULPHATES, NITRATES AND CHLORIDES	Sample weight [mg]: 100 Water quantity [mL]: 100 Concentration of SULPHATES [mg/L]: 111.2 Concentration of NITRATES [mg/L]: 0.52 Concentration of CHLORIDES [mg/L]: 96.7	PERCENTAGE IN WEIGHT OF THE SALTS COMPARED TO THE SAMPLE (ACCORDING TO UNI 11087/2003) [%]: SULPHATES = 11.12 % NITRATES = <0.1% CHLORIDES = 9.67%

PORTABLE DIAGNOSTIC LABORATORY

**ONE CLICK
TECHNICAL REPORT**



Modular summary table

				Construction site: Bastiglia - Santuario S. Clemente				Contacts:					
HYGROLAB technical services				Address: Via San Clemente Valle - Bastiglia				Client: Alchimia					
TIME	DATE	OPERATOR	ENVIRONM. T°	ENVIRONM. HUMID.								PAGE	
9:00	23/12/2014	Cigarini-Salieri	9 C°	76,0 %								1	
Data found on construction site					Humidity analysis				Salts analysis				
No	T° surface	Depth hole	Height from floor (cm)	Wall Materials	Weight no load	Weight dump	Weight dry	Hum. %	Total soluble salts	Mg Samp	Sulph. %	Nitr. %	Chlor. %
1	8,6	5	200	brick	1,342	3,909	3,830	3,18	53	105	< 0,5	< 0,1	0,48
2	8,5	5	100	brick	1,341	5,017	4,514	15,85	52	100	< 0,5	< 0,1	0,48
3	9,0	6	30	mixed	1,339	4,400	4,012	14,52	53	105	< 0,5	< 0,1	0,46
4	8,0	6	200	brick	1,344	3,993	3,899	3,68	63	102	1,64	< 0,1	0,4
5	7,6	5	100	mixed	1,337	3,506	3,324	9,16	90	103	2,5	< 0,1	0,3
6	7,6	6	30	brick	1,316	3,756	3,519	10,76	60	104	< 0,5	< 0,1	0,61
7	8,0	5	200	mixed	1,340	4,583	4,403	5,88	80	100	< 0,5	< 0,1	0,6
8	8,2	5	100	mixed	1,323	3,909	3,702	8,70	83	97	2,32	< 0,1	< 0,2
9	8,5	6	60	brick	1,320	3,487	3,269	11,19	90	103	2,37	< 0,1	0,24

DIAGNOSTIC DEEPENING

MELLONCELLI EXTENDED LAB



- ONLINE QUOTE FOR LABORATORY ANALYSIS
- PREPARATION OF CHAMPIONS TOUR
- DOWNLOAD RESULTS BY WEB
- AUTOMATIC ANALYSIS OF THE PROJECT
- AUTOMATIC INTEGRATION OF RESULTS IN THE REPORT

Our multi-service center has all the modern laboratory techniques for the chemical / physical characterization of highly specialized materials and personnel in the field of diagnostics of cultural heritage.

The modular structure of **MELLONCELLI HygroLab** allows Melloncelli engineers to fill customized automatic report, containing times and costs of the survey phase, and constantly update the software via web.

LIST ANALYSIS ON ARTIFICIAL STONE



1. CALCIMETRY ANALYSIS OF MORTAR - GASVOLUMETRIC METHOD
2. GRANULOMETRIC ANALYSIS OF MORTAR AGGREGATE BY SIEVING
3. PETROGRAPHIC CHARACTERIZATION OF MORTAR ON GLOSS SECTION
4. QUANTITATIVE ANALYSIS OF SOLUBLE SALTS BY ION CHROMATOGRAPHY (IC)
5. PETROGRAPHIC CHARACTERIZATION OF MALTA ON THIN SECTION
6. CHARACTERIZATION OF STONE MATERIAL BY THERMOGRAVIMETRIC METHOD
7. ANALYSIS OF STONE MATERIAL BY SCANNING ELECTRON MICROSCOPY (SEM) ON GLOSS SECTION
8. TEST OF ACCELERATED AGING ON STONE MATERIAL BY CLIMATIC
9. TEST UNDER THE UNI-CULTURAL HERITAGE LAW
10. ANALYSIS OF PICTORIAL LAYERS BY RAMAN SPECTROSCOPY
11. DETERMINATION OF THE CONTENT OF ORGANIC BINDERS OF MORTAR BY FOURIER TRANSFORM INFRARED SPECTROSCOPY (FTIR)
12. CHEMICAL / PHYSICAL CHARACTERIZATION OF BINDER AND MORTAR AGGREGATE BY X-RAY DIFFRACTION (XRD)

REFERENCES



San Paolo Maggiore - Bologna



Villa Donini - Longara (BO)



Monza - Santa Maria delle Grazie



Viadagola building (BO)

REFERENCES



Villa Contini – Gualtieri (RE)



Jewish museum - Casale Monferrato



Poor Clare convent - Forlì



Bastiglia (MO) S. Clemente Sanctuary



Reno Centese S. Anna Church (FE)

REFERENCES



Bolzano - Fond. Sodal. Cattolico



Bologna Santa Caterina



Imola - Cathedral



Sassuolo (MO) - Villa Belvedere



Poor Clare Monastery PERUGIA



MELLONCELLI srl
Via Argine Po, 174
46028 SERMIDE (MN)
Tel. 0386 96.00.04
96.02.68
FAX 0386 96.03.35
e-mail:
info@melloncelli.it
Internet:
www.melloncelli.it

TECHNICAL SPECIFICATIONS

GENERAL:

CONTROL SOFTWARE:

HYGROLab for Linux – v.1.0, multilingual (available in Italian, English, French, German, Portuguese), with interactive guide to execution of analysis, project database management, automated technical report writing, automatic update functions via the web, calculation of the budget for laboratory analysis, user manual

SUITCASE DEGREE OF PROTECTION: *waterproof*

DIMENSIONS: *(55.9 x 47 x 21.6cm)*

WEIGHT: *12,1 kg*

FUNCTIONS:

● Humidity measurement with weight method

Weighing, drying, processing of samples kit by MELLONCELLI HYGROLAB, Reference standards: UNI 11085: 2003 - Cultural heritage - natural and artificial stones - " Moisture content determination. Gravimetric method"

● Total soluble salt testing

Conductivity meter and pH meter; operating range: pH from 0.00 to 14.00; EC from 0 to 3999 μ S/cm; resolution: 0.01 pH; EC: 1 μ S/cm; precision: \pm 0.05 pH; EC: \pm 2% FS; temperature: \pm 0.5 $^{\circ}$ C; automatic temperature compensation; weighing set; dehydration; samples processed by MELLONCELLI HYGROLAB; Reference standards: UNI 11087:2003 - Cultural heritage – Natural and artificial stones – Determination of soluble salt content

● Tests to analyse sulphate, nitrate, chloride content

Photometer for transmission measurements; light source: LEDs; wave-length: 525 nm; operating range: SULPHATES: 5-150 mg/L; NITRATES: 0.1-45 mg/L; CHLORIDES: 0-210 mg/L; weighing set; dehydration; samples processed by MELLONCELLI HYGROLAB; Reference standards: UNI 11087:2003 - Cultural heritage – Natural and artificial stones – Determination of soluble salt content

● Ambient parameter measurement

Infrared pyrometer to measure surface temperature; measurement range: -20_+270 $^{\circ}$ C; resolution: 1 $^{\circ}$ C; precision: \pm 3 % of the measurement value -1 $^{\circ}$ C; measurement point (distance / size ratio): 8:1; emissivity: 0.95

Psychrometer; measuring range: 0-100 % RH; 30...+100 $^{\circ}$ C; Resolution: 0.01 % RU; Temperature: 0.01 $^{\circ}$ C; Precision: \pm 2.0 % RU at 25 $^{\circ}$ C; \pm 0.5 $^{\circ}$ C at 25 $^{\circ}$ C; wet bulb temperature and dew point temperature calculation

● Measurement using touch hygrometer

Thanks to the connectable probes, optionally available, the instrument detects the following values:

- Humidity
- Equilibrium moisture of materials
- pressure dew point in compressed air systems
- air temperature
- surface temperature
- internal Temperature
- U-value
- absolute pressure