DYCOMETAL

Testing Technology

BUILDING INDUSTRY

The Company

DYCOMETAL EQUIPOS DE CONTROL DE LA CALIDAD, S.L., the Trademark that has given to their products the commitment that each one of them, depending on its own characteristics, can reproduce faithfully all the environmental conditions that Nature is able to offer to obtain a better Quality of the materials.

DYCOMETAL was born in 1988 as a Corporative Society. It was a difficult beginning in which, certainly, the Quality of our Chambers, the sternness of our work and the spirit of our employees made the start of the Company possible.
In 1995, the Company becomes a Limited Company and the leadership of DYCOMETAL in Development and Manufacture of Climatic, Thermic and Corrosion Chambers in Spain is consolidated .
The needs of the markets made it necessary an extension of the structure of the Company and in 1998, we moved: the Company grew and its employees, too. Exporting activity was increased, Technical Service and After-Sales Assistance were extended and it was the beginning of a great flexibility in the specific demands of each Customer, market and country.
In December 2007, in the celebration of 1st Quality and Technological Innovation Awards 2007, organized by the Pharmaceutical Industry magazine, we were awarded the prize for best supplier in the Climatic Chambers category.

The large market demand, the creation of a testing laboratory and a Technical Office requires us to move in 2008 to Viladecans, tripling the production space.

For DYCOMETAL, the Quality is not only defined depending on the equipments and manufacture process, but also depending on our customers' requests. This is the reason for our Human Equipment to keep working to improve, from day to day , our product and After-Sales service. It is our desire that this strength results in profits for all our Customers.

Air Forced
HEATING OVENS

GENERAL FEATURES.

Essential equipment in any laboratory. Dycometal is specialized in shaping equipment with special characteristical (dimensions, temperature ranges, thermal gradient, number and type of trays, ...)

➢ By Structure

1_Dycometal manufactures standard Heating Ovens with volumes from: 80 to 3000 liters.

150 liters Heating Oven

Possibility to put one shelf each 5 cm.

2_Dycometal manufactures, high temperature heating ovens (up to +400ºC), These equipments are manufactured in refractory steel internally. The electrical and control box are separated to ensure thermal insulation.
These equipments are equipped with flue pipe.

➢ Accessories

– Air extraction turbine

– Turn On/ turn off timer

– Programmer for heating ramps

– Special shelves

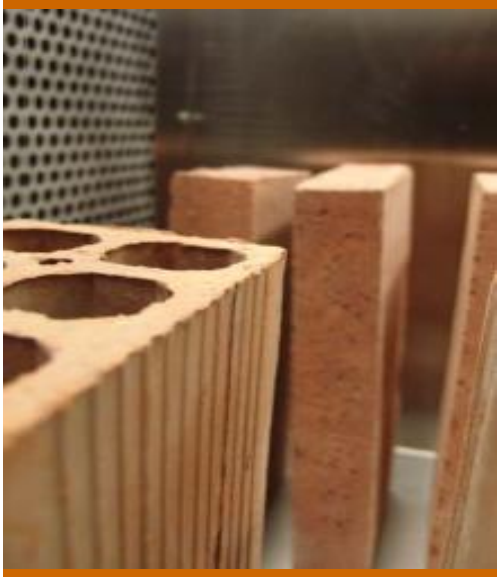
– Heating oven table

– Digital safety thermostat

THERMAL SHOCK

Test chambers

Vertical construction with upper heating compartment, and lower with thermostatic bath.



➢ **By Structure**

– Sometimes, it's necessary do combined test with heat in air and heat/cool with water. Also, it's necessary to make an thermal shock between both types of methods. For this reason, Dycometal has manufactured the Thermal shock test chamber with thermostatic bath in the lower compartment.

– The normal temperature range are maximum +150ºC, to the upper compartment, and in the lower compartment, temperatures between +5ºC and -40ºC.

– The samples are placed in the test platform which is driving, in its up and down movement, by a pneumatic cylinder. The system is totally automated by timers and count- cycles.

CLIMATIC TEST CHAMBERS
(Cold/ Heat/ Humidity)

➢ **Its application in the different building material sectors, is varied.**

1_Dycometal has different solutions: compact construction (superior image) and panelable walk-in construction (right image). The choice between one and the other comes by the load needs of the sample to test.

GENERAL FEATURES.

Our chamber has a good reference in concrete industries. It's is used for concrete samples in conservation studies, where it's necessary a high humidity (near saturation) and temperatures of 20°C.

Walk-in Chambers

2_The Walk-in chambers has high load capacity, and the same time it guarantee the same climatic conditions that the compact test chambers. The minimum volume of this chambers is 200 liters. The regulation of the temperature and humidity is doing normally by two regulators to work in fix consign.
It's normal to equip this systems with RS-232 or Ethernet port to register

➢ Accessories

– Microprocessor control to do the heat/ cold / stabilization ramps test. High capacity of programs in the memory.

– Acquisition software with capacity to work cycle programmed. Based in Windows

– Special stainless steel shelves

– Entry port to introduce probes, thermocouples, etc.

– Reverse osmosis or demineralizer system, like an optional

GENERAL FEATURES.

Our thermostatic baths are made for heavy samples.

THERMOSTATIC BATHS

Water heating

Sometimes, it's interesting to test the resistance degree of the materials to a liquids like water, oil or other substances. These type of tests are perform in different degrees: with water at room temperature, with ebullition water, etc.

150 l. thermostatic bath

1_It's usual to equip these equipments with a condenser in order to maintain the temperature water between 18-25°C. Also, in equipments which can regulate the temperature till 90/100°C, the cover is usually designed with an angle and one chimney to vent the vapors. To obtain a good homogeneity of the water, it's added a heating pump which recirculates the water in a constant form. The heaters will be in the base of the bath, and they are protected by a holed sheet.

Thermostatic bath
6 compartments

2_In high volumes, the chamber will be equipped with pneumatic aperture to lift the cover easily.

FREEZER CABINET

Horizontal construction and with forced air circulation.

Specially designed to acclimate tests at low temperatures. Sometimes, are used to simulate, with a heating oven, freeze-thaw tests. These equipments are ideal for high volumes samples.

_Depending of the volume, It's possible to install pneumatic cylinders to open the cover easily. The most common is install gas springs, they are cheaper and equally functional. Dycometal has standard equipments with volumes: 150, 250, 350 and 500 liters. All the equipments are manufactured with a temperature range up to -40°C.
An alternative design are the vertical freezer cabinets, an ergonomic alternative for small samples.

AUTOMATIZED EQUIPMENT FOR FREEZE-THAW TEST

MOD. CHD-525, According with freeze-thaw test standard

GENERAL FEATURES.

The building materials which are installed outdoor, have to endure strong environmental conditions during years: rain, ice, sun, wind, etc. In Winter, undergoing high thermal changes between day and night; with humidity absorption during the day and frost in the night, causing a high degradation in the materials.

With the freeze-thaw test, the building materials manufacturers can optimize their products in the laboratory, reducing and erasing damages. This gives to the users a high competitive advantage.

_This equipment is compounded by two modules: freezer cabinet (where place the samples to be tested). Thermostatic bath (where acclimate the water to do the freeze-thaw cycles with water). Dycometal equips the cabinets with a potent microprocessor, which has a high number of programs for carrying the tests for the building materials. Bibliography[1]

[1]_UNE- EN ISO 10545 "Baldosas Cerámicas", UNE 67048 "Bloques cerámicos", UNE 22174 "Granitos ornamentales", UNE 22184 "Mármoles y calizas", UNE 67028 "Ladrillos", UNE 67034 "Tejas cerámicas", UNE-EN 491 "Tejas de hormigón", UNE-EN 1348:1997 "Adhesivos para cementos cola", EN 1367-1:1999 "Áridos", UNE-EN 539-2, Método C "Tejas de arcilla cocida", UNE-EN 494 "Placas onduladas o nervadas de fibrocemento y sus piezas complementarias para cubiertas", UNE 7070 "Adoquines de piedra", UNE-EN 12371: 2002 "Piedras naturales", UNE-EN 1341:2001 "Losas de piedra natural para pavimento exterior"; UNE-EN 1342 "Adoquines de piedra natural para pavimiento exterior"; UNE-EN 1343 "Bordillos de piedra natural para pavimiento exterior", UNE-EN 13755 "Métodos de ensayo para piedra natural. Determinación de la absorción de agua a presión atmosférica", UNE-EN 12326-2 "Producto de pizarra y piedra natural para tejados inclinados y revestivimientos. Parte 2 Metodos de Ensayo".

➢ **The advantages of these equipments are:.**

– Profitability in the medium term, both working hours and comfort.

– Easy to use

– High temperature accuracy

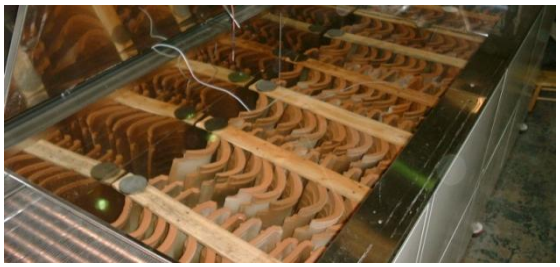
– Robust indoor chamber (AISI 316L)

– Reliable

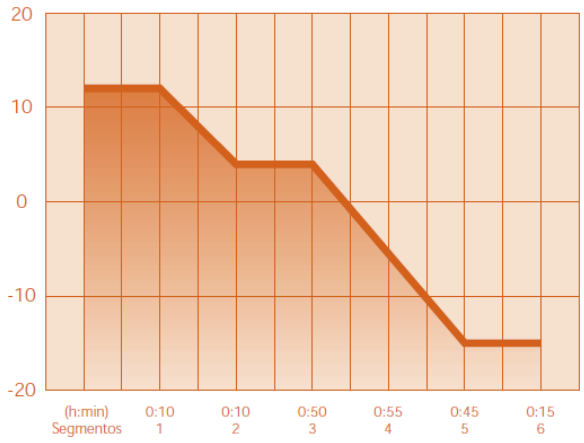
1_The control of the equipment, is totally managed from the control box , installed in the lateral of the cabinet. One RS-232 port is at the rear of the cabinet, allows to connect a PC and control the equipment and data acquisition of the test; thanks to a complete software. The PLC guarantee the place of the possible system fault.

2_Dycometal is characterized by be actualized in the newest standards. For this reason, we have modified some points in the cabinet in order to perform the standard UNE-EN 539-2, method B "Clay roofing tiles". The standard requests water dewy over the samples. Thus, we have installed atomizers with an air pump and some modifications in the PLC to comply with this standard.

Thermostatic bath is the module where reconditioning the water; and is the place where the water goes to the cabinet.



UNE-EN-539-2 test. Method C. "Clay roofing tiles"



Segment number	Setpoint	Duration (minutes)
1- Water transfer, water cycle	12°C	00:10:00
2- Temperature maintenance, water cycle	12°C	00:10:00
3- Water cycle	4°C	00:50:00
4-Temperature maintenance, water cycle	4°C	00:10:00
5- Air cycle	-5°C	00:55:00
6- Air cycle	-15°C	00:45:00
7- Air cycle	-15°C	00:15:00

Dycometal has 4 standards products:

Model	Liters	Temp. °C	External dimensions. mm Thermostatc reservoir			Internal dimensions. Mm. Cabinet			External dimensiones. mm. Cabinet + electrical control box		
			Height	Width	Depth	Height	Width	Depth	Height	Width	Depth
CHD-525	525	- 25 + 30	1980	1260	1150	750	1000	700	1250	2800	925
CHD-720	720	- 25 + 30	1980	1360	1150	800	1200	750	1350	3000	1000
CHD-896	896	- 25 + 30	2100	1450	1320	800	1400	800	1350	3160	1250
CHD-1400	1400	- 25 +30	2200	1554	1694	700	2500	800	1270	4825	1250

The success of our equipments is not only in Spain if not at the world, our customers guarantee it. They not only appreciate our chambers but also our technical service, fundamental point for this equipments.

FREEZE-THAW TEST CABINET

MOD. CHDE, compatible for pieces of masonry according with prEN- 772-22 standard, and baked clay cobblestones according with UNE-EN 1344:2002

➢ **Dycometal has develop several models which reproduce the spirit of the standards.**

_The objective and ending of the equipment is the possibility to reproduce totally automatized freeze-thaw tests to murals or baked clay cobblestones. The system is accompanied with a water spray device (rain type), impacting over the interior walls of the murals.

➢ **In order to comply with the requirements of the standards, the cabinet has the next features (depending of the number of murals to test: one, two or three)**

-Temperature range: regulable from -20°C to +30°C.

- Temperature change rate: minimum cooling capacity from +25°C to -15°C in 20 minutes.; minimum heating capacity from -15°C to +25°C in 20 minutes.

- Heat dissipation: 400W/m2,_±50W/m2, verified by heating rug supplied with the equipment.

- Water spray system: by atomizers oriented to each mural, and guarantee a volume flow rate between 2 and 5 liters/minute. The accuracy over the setpoint have to be almost 0,025 liters/minute.

- Water conditioning : there is a 250 liters capacity thermostatic bath inside of the freeze cabinet where conditioning the water between 18 to 25°C by immersion heaters.

- The cooling system and the control box are in a independent module.

- Thermocouples K type, for the murals.

- Murals place: in stainless steel supports (the inner face of the mural will suffer the test; the exterior face will be exposed to the room temperature)

SOME REFERENCES:

AITEMIN, ASLAND NAVARRA, CEBTP SCE MATERIAUX, CEMENTOS ALFA, CEMENTOS BARREIRO, CEMENTOS EL MOLINO, CEMENTOS EL MONTE, CEMENTOS ESFERA, CEMENTOS LA CRUZ, CEMENTOS LA UNION, CEMENTOS PARRILLA, CEMENTOS PORTLAND, CEMENTOS REZOLA, CEMENTVAL, CENTRO TECNOLOGICO ANDALUZ DE LA PIEDRA, CENTRO DE CONTROL DE CALIDAD DE SORIA, CENTRO REGIONAL DE CONTROL DE CALIDAD DE VALLADOLID, CENTRO TECNOLOGICO DEL GRANITO, CERAMICA LA ESCANDELLA, CERAMICAS MALPESA, CIA VALENCIANA DE CEMENTOS PORTLAND, CTTB-CENTRE TECHNIQUE DES TUILES ET BRIQUES, DEGUSSA CONSTRUCTION CHEMICALS ESPAÑA, DIPUTACION FORAL DE ALAVA, ENSATEC-COLEGIO OFICIAL DE APAREJADORES Y ARQUITECTOS DE LA RIOJA, EPTISA, ESTABLECIMIENTOS BAIXENS, FUNDACION CENTRO TECNOLOXICO DA LOUSA, GIKESA (LABORATORIO DE APAREJADORES DE GUIPUZKOA), ICAES, IGME-INSITITUTO GEOLOGICO Y MINERO DE ESPAÑA, INDYCCE, INSTITUTO EDUARDO TORROJA CSIC, INTEMAC, INTROMAC, ITC-INSTITUTO TECNOLOGICO DE LA CONSTRUCCION, INSTITUTO TECNOLOGICO DE LA CERAMICA, INSTITUTO TECNOLOGICO DE CASTILLA Y LEON, LABATEC-LABORATORIOS DE ENSAYOS, LABORATOIRE EDF-TEQF, LABORATORIO PARA LA CALIDAD DE LA EDIFICACION-ARAGON, LABORATORIO GRAL DEL AREA DE LA CALIDAD EN LA EDIFICACION DEL PAIS VASCO, HDR-HERMANOS DIAZ REDONDO, LABORATORIOS CEMOSA, LABORATORIO GENERAL DEL AREA DE CALIDAD EN LA EDIFICACION DE LLEIDA, LAFARGE CTEO, LAFARGE COUVERTURE AIX EN PROVENCE, LAFARGE COUVERTURE MARSEILLE, LAFARGE COUVERTURE LIMOUX, LCBTP, LOEMCO-LABORATORIO OFICIAL PARA ENSAYOS DE MATERIALES DE CONSTRUCCION, MINISTERIO DE FOMENTO (LAB. CENTRAL DE MATERIALES), PAYMA COTAS, SEINCO, TECMASA-TEJAS DE CASTILLA LA MANCHA, TYLMESA-TEJAS Y LADRILLOS DEL MEDITERRANEO, UNILAND CEMENTERA, UNIVERSIDAD CARLOS III DE MADRID (DPTO. MATERIALES), UPC (LABORATORIO DE ESTRUCTURAS), UPC (AREA DE CONSTRUCCIONES ARQUITECTONICAS), …

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