

# Polyurethane

One vocation: Insulation

Two systems: Poliuretano **S** Spray & Phono Spray



# Synthesia



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# Who we are



**SYNTHESIA** was founded in 1964 by a group of Spanish entrepreneurs. It started out basically as a chemical product company, manufacturing paint for building facades, plastisols and ureaformol insulation.

In 1966 it moved into the field of Polyurethane, which has gradually become the company's core business, eventually serving as a platform for its international projection, and becoming a national and international reference point. As of the 1970s, the company embarked upon a process of vertical integration targeting the manufacture of raw materials as an extension of its line of formulated products.

The company strategy has always been based on research and development, and it is one of the few independent companies with its own technology in the sector.

**SYNTHESIA** addresses its different market sectors through its three business units:

- Polyurethanes
- Resins
- Polyesters (Hoocker)

Currently, **SYNTHESIA** has some 150 collaborators and is part of a complex structure business holding. It includes companies engaged in activities ranging from polyurethane insulation to factories located in different parts of the world. This structure allows it to stand out as a powerful group, highly specialised in polymers and polyurethanes, particularly focused on foam for insulation.

**SYNTHESIA** is a member of AECOR, ANDIMAT, ATEPA, IPUR, PU Europe, EUROPUR, C.E.P. and FEDEQUIM.



# What we do

SYNTHESIA PROVIDES  
YOU WITH ITS EXPERIENCE AND  
THE AID AND ASSESSMENT OF EXPERT  
PROFESSIONALS TO IMPLEMENT  
ANY PROJECT SUCCESSFULLY



## Research, Quality, Service

The work of Synthesia is based on three core lines or objectives: **Research, Quality and Service**. These three tools have driven the creation, development and marketing of new products, such as **PHONO SPRAY**. Its combination with closed-cell polyurethane foam (**POLIURETAN S SPRAY**) delivers a continuous, waterproof and thermo acoustic building solution in situ.

We make two types of polyurethane systems, namely the **PHONO SPRAY** and the **POLIURETAN S SPRAY**.

Synthesia seeks to be the favourite or reference supplier in each one of the market-product segments we decide to compete in. By offering innovative and different products with superior service, through flexible and professional organisation to achieve the satisfaction of clients, suppliers, collaborators and shareholders.

## One vocation, two systems





# Poliuretano S Spray



## Poliuretano S Spray



It is an waterproof sprayed polyurethane system for thermal insulation.

Its closed-cell structure makes it a waterproof and transpirable material. It delivers condensation-free solutions. Its low thermal conductivity coefficient ( $\lambda= 0.022-0.028 \text{ W/mK}$ ) makes it the best thermal insulating material on the market. Its continuous application prevents thermal bridges and guarantees continuous protection against water. No rendering needed.

The only material on the market that can certify its pre- and post-installation properties.  
Good fire behaviour in final applications: EUROCLASS B S1D0.

Major advantages in on-site installation: In situ, rapid spraying. Insulation and waterproofing in a single application. No on-site storage required. The best value for money.

### POLIURETANO S SPRAY SYSTEMS

|                          | APPLICATION                 | AVERAGE DENSITY APPLIED (kg/m <sup>3</sup> ) | REACTION TO FIRE<br>UNE 23727<br>UNE-EN<br>13501-01:2002 | THERMAL CONDUCTIVITY COEFF. (W/mK) | RESISTANCE TO COMPRESSION (KPa) |
|--------------------------|-----------------------------|--|--|------------------------------------|---------------------------------|
| <b>S 303EW, S ISOC H</b> | PARTITIONS                  | 33-37  | M3<br>EUROCLASS E  | 0.028                              |                                 |
| <b>S 353EW, S ISOC H</b> | PARTITIONS AND TILTED ROOFS | 37-43  | M3<br>EUROCLASS E  | 0.028                              |                                 |
| <b>S 403EW, S ISOC H</b> | PASSABLE ROOFS              | 43-50  | M3<br>EUROCLASS E  | 0.028                              | 242                             |
| <b>S 503EW, S ISOC H</b> | PASSABLE ROOFS AND FLOORING | 50-60  | M3<br>EUROCLASS E  | 0.028                              | 339                             |

ALL THE SYSTEMS HAVE THE AENOR N MARK FOR PRODUCT QUALITY PRODUCT AS THERMAL INSULATING MATERIAL FOR USE IN BUILDING ACCORDING TO CERTIFICATE NOS. 020/002841-42-43-44-45-46-47 AND 020/002848, VALID UNTIL 27/01/2014.





## POLIURETAN S SPRAY FIRE-REPELLANT SYSTEMS

|                              | APPLICATION                           | AVERAGE DENSITY APPLIED (kg/m <sup>3</sup> ) | REACTION TO FIRE<br>UNE 23727<br>UNE-EN<br>13501-01:2002 | THERMAL CONDUCTIVITY COEFF. (W/mK) | RESISTANCE TO COMPRESSION (KPa) |
|------------------------------|---------------------------------------|--|--|------------------------------------|---------------------------------|
| <b>RF 351C<br/>ISOC H *</b>  | FALSE CEILINGS, ELEVATED FLOORS, ETC. | 35-45  | M1<br>EUROCLASS C  | 0.028                              | 175 – 225                       |
| <b>RF 352D<br/>ISOC H **</b> | INDUSTRIAL PREMISES, FARMS, ETC.      | 37-43  | M2<br>EUROCLASS D  | 0.028                              | 175 – 225                       |

(\*) AENOR N MARK CERTIFICATE NO. 020/002605, VALID UNTIL 15/02/2012

REACTION TO FIRE CERTIFICATE ISSUED BY GAIKER WITH REPORT no. P-03-377/1 DATED OF 30-04-03

(\*\*) REACTION TO FIRE CERTIFICATE ISSUED BY GAIKER WITH REPORT no. P-03-377/1 AND P-04-747 DATED 30-04-03 AND 06-10-04

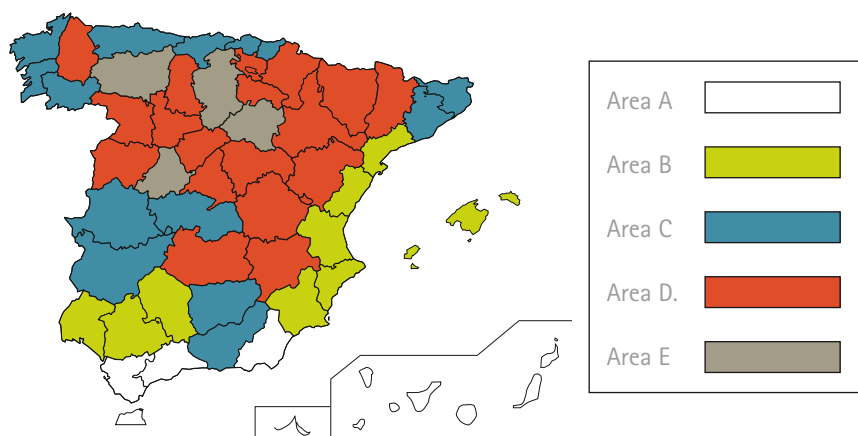
### 1. Energy saving (DB-HE1)

The CTE defines different climate areas depending on winter conditions and, in turn, the required thermal transmission values are established for each area. Poliuretán S Spray rigid polyurethane sprayed foam makes it possible to reach the optimal insulation levels required by the CTE with minimum thickness.

There are two options for justifying compliance with the energy-saving conditions required by the CTE:

- General option: by means of the LIDER program or another acknowledged programme.
- Simplified option: by means of compliance with the limit values (see attached table).

Requirements according to the Spanish Technical Building Code (CTE). There is a specific Technical Building Code for each country.



#### LIMIT TRANSMITANCES (W/m<sup>2</sup>K)

|   | A     | B     | C     | D     | E      |
|---|-------|-------|-------|-------|--------|
| <b>Facades</b>                            | 0.94  | 0.82  | 0.73  | 0.66  | 0.57   |
| Thickness (mm) (Thermal Bridge Isolation) | 30-35 | 30-40 | 35-45 | 40-50 | 40-55  |
| (Thermal Bridge No Isolation)             | 30-40 | 30-40 | 40-55 | 60-80 | 80-100 |
| <b>Flooring</b>                           | 0.53  | 0.52  | 0.50  | 0.49  | 0.48   |
| Thickness (mm)                            | 30-45 | 30-45 | 30-45 | 30-45 | 35-50  |
| <b>Roofs</b>                              | 0.50  | 0.45  | 0.41  | 0.38  | 0.35   |
| Thickness (mm)                            | 30-50 | 40-55 | 45-65 | 50-70 | 55-75  |



## 2. Protection from humidity (DB-HS1)

The DB-HS1 demands a degree of impermeability of the different closings used in building. This coefficient ranges from degree 1 (minimum impermeability) to degree 5 (maximum impermeability) in the case of facades, walls or floors, and a single degree of impermeability in roofs.

In facade applications, Poliuretán **S** Spray achieves the maximum degree of impermeability **-5-** using simple building solutions, with no need for rendering or water-repellant mortars.

Poliuretán **S** Spray acts as a moisture-regulating membrane, since, as it is waterproof, it is permeable to water vapour. And depending on weather conditions, water vapour can pass through, avoiding condensations.

Requirements according to the Spanish Technical Building Code (CTE). There is a specific Technical Building Code for each country.

4. RESULTADOS

Determinación de la impermeabilidad al agua según norma UNE EN 12087-2002

Antes de proceder a la realización de ensayos los probetas denominadas "con polí" se han hidratado para eliminar todo posible riesgo de los mismos. Por el ensayo de EN 12087-2002 y EN 12087-2002 obteniendo los siguientes resultados:

Los resultados se muestran en la siguiente tabla:

| Referencia       | Impermeabilidad |               |               |
|------------------|-----------------|---------------|---------------|
|                  | Prueba 1        | Prueba 2      | Prueba 3      |
| SI3003 con polí  | ---             | ---           | ---           |
| SI3003 sin polí  | Satisfactoria   | Satisfactoria | Satisfactoria |
| SI3003 con polí  | Satisfactoria   | Satisfactoria | Satisfactoria |
| SI4003 con polí  | Satisfactoria   | Satisfactoria | Satisfactoria |
| SI5003 con polí  | ---             | ---           | ---           |
| SI5003 sin polí  | Satisfactoria   | Satisfactoria | Satisfactoria |
| RF 2012 con polí | Satisfactoria   | Satisfactoria | Satisfactoria |

DETERMINACIÓN DE LAS PROPIEDADES DE TRANSMISIÓN DE VAPOR DE AGUA

El ensayo se realizó en un recinto controlado de temperatura y humedad.

Nombre de ensayo: UNE EN 12087-2002

Referencia: SI3003

Material: LAT 2010-03-03

Acabamiento: Impermeabilización

Temperatura (23 ± 0,5) °C

Humedad relativa (50 ± 0,5) %

Tiempo: 20 días

Coeficiente de transmisión de vapor de agua: 0,00

| Procedimiento | Temperatura (°C) | Humedad relativa (%) | Tiempo (días) |
|---------------|------------------|----------------------|---------------|
| 1             | 23,0             | 50,0                 | 20            |
| 2             | 23,0             | 50,0                 | 20            |
| 3             | 23,0             | 50,0                 | 20            |
| 4             | 23,0             | 50,0                 | 20            |

## 3. Fire safety (DB-S1)

Poliuretán **S** Spray is an organic, and therefore combustible, material, and numerous studies have demonstrated its good fire behaviour in its final application.

The rigid polyurethane foam Poliuretán **S** Spray complies, in all the applications analysed, with the fire safety levels required by the CTE.

|                                      | WALLS AND CEILINGS (INTERIOR)                        |   |                                   |                     |                 |                                  |
|--------------------------------------|--|---|-----------------------------------|---------------------|-----------------|----------------------------------|
|                                      | Poliuretán <b>S</b> Spray after EI-30 <sup>(1)</sup> | Poliuretán <b>S</b> Spray after no EI-30 <sup>(1)</sup> | Poliuretán <b>S</b> Spray visible | Flooring (interior) | Roofs (outside) | Facades and partitions (outside) |
| Housing                              | YES  |   |                                   |                     | YES             | YES <sup>(3)</sup>               |
| Rest of occupiable areas and parking | YES  | YES <sup>(2)</sup>                                      | NO                                | YES                 |                 |                                  |
| Hidden non-watertight spaces         | YES  | YES <sup>(2)</sup>                                      | NO                                | --                  |                 |                                  |

(1) EI-30 is equivalent to RF-30. A 4-cm plastered partition is EI-30

(2) Depending on the classification in the application used

(3) Except ventilated facades and partitions of more than 18 m or accessible

# Phono Spray

LOW-DENSITY  
THERMO ACOUSTIC  
POLYURETHANE  
SPRAYING

# S904



## Characteristics

It is an open-cell low-density sprayed polyurethane system for thermal and acoustic insulation from airborne noise in different building solutions.

Its porosity and elasticity make it an absorbent material in intermediate chambers of building solutions with an acoustic absorption coefficient of  $\alpha = 0.5$ .

Combining the Poliuretán S Spray waterproof and thermal closed-cell polyurethane foam with the Phono Spray S904 [5]>904 open-foam thermo acoustic polyurethane foam provides a waterproof and thermo acoustic in situ solution that is unique on the market.

It is a low-density open-cell foam Dens.applied < 20 kg/m<sup>3</sup>

Airflow resistivity:  $r = 5-6 \text{ kPa s/ m}^2$

Dynamic Stiffness:  $s' = 4.83 \text{ MN/m}^3$

It is a good thermal insulating material.  $\lambda = 0.036 \text{ W/m K}$ .

Reaction to fire (UNE-EN 13501-01:2002) in final application: EUROCLASS B S1 D0

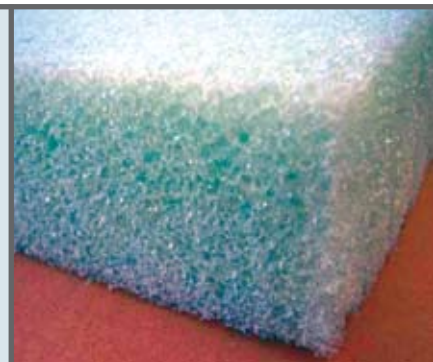
Same application advantages as Poliuretán S Spray. Continuous system without thermal or acoustic bridges

| PROPERTIES   | PHONO SPRAY S904                  |
|--|-----------------------------------|
| APPLIED DENSITY UNE -EN 1602                                 | 12 ± 2 Kg/m <sup>3</sup>          |
| RESISTANCE TO COMPRESSION UNE-EN 826                         | 10 ± 3 KPa                        |
| DIMENSIONAL STABILITY 24 h, -30, 60°C                        | 0.5% Vol.                         |
| CLOSED CELLS ISO 4590  | < 10%                             |
| THERMAL CONDUCTIVITY COEFF. 20°C, 1 year                     | 0.036 W/m K                       |
| ACOUSTIC ABSORPTION COEFF.<br>according to UNE-EN 20354:1993 | 0.5                               |
| AIRFLOW RESISTIVITY r<br>according to UNE-EN 29053:1993      | 5-6 kPa s /m <sup>2</sup> *       |
| DYNAMIC STIFFNESS s'<br>According to UNE-EN 29052/1          | 4.83 MN /m <sup>3</sup> **        |
| FIRE BEHAVIOUR EUROCLASSES UNE-EN 13501-01:2002              | B S1 D0 (In final application)*** |

\* Tested and certified r (Airflow Resistivity) in CEIS, report: LAT0067/08, 25/06/08.

\*\* Tested and certified for Dynamic Stiffness s' in Laboratories APPLUS, report no. 08/32309712, 30/07/08.

\*\*\* Tested and certified In Gaiker Laboratories, report no. P-08-10356, 25/05/2009





# Building solutions



## 1. Facades

For facades, we combine the Poliuretano S Spray impermeable and thermal closed-cell polyurethane foam with the Phono Spray S 904 thermo acoustic open-cell polyurethane foam, thus achieving a unique impermeable and thermo acoustic continuous solution in situ.

The airborne noise insulation requirement according to the CTE (DB HR) varies between 30 and 51 dBA depending on the use to which the building is put (residential, sanitary, cultural, teaching, etc.), the premises (bedrooms or rooms) and the daytime noise index. These values consider the increase of 4 dBA required when the prevailing outside noise is from aircrafts. The number of gas or windows in the facade must also be considered, in this case, face demands will depend on the acoustic insulation to be offered by the windows.

### THERMO ACOUSTIC INSULATION TESTING AND MEASURING

| DESCRIPTION  | U (W/m <sup>2</sup> K) | R <sub>A</sub> (dBA) | D <sub>2m,nT, ATr</sub> (dBA) |
|--|------------------------|----------------------|-------------------------------|
| LP 1/2 foot + 10 mm Poliuretano S Spray + 30 mm Phono Spray S904 + PYL13 | 0.722                  | 52                   | >45                           |
| LP 1/2 foot + 20 mm Poliuretano S Spray + 30 mm Phono Spray S904 + PYL13 | 0.574                  | >52                  | >45                           |
| LP 1/2 foot + 20 mm Poliuretano S Spray + 40 mm Phono Spray S904 + PYL13 | 0.502                  | >55                  | >50**                         |
| LP 1/2 foot + 30 mm Poliuretano S Spray + 40 mm Phono Spray S904 + PYL13 | 0.425                  | >60*                 | >50**                         |
| LHD7 + 10 mm Poliuretano S Spray + 40 mm Phono Spray S904+ LHD7          | 0.570                  | 45***                | >40                           |

PB: Perforated Brick placed at 1/2 foot, measurements: 24 x 11.5 x 7 cm.

PYL13: Laminated plaster panel 13 mm.

LHD7: Double Hollow Brick, measurements: 24 x 11.5 x 7 cm.

The outsides are coated with single-layer mortar and the interiors with plasterwork.

(\*) Certified issued by the Applus of Barcelona, dossier no. 3009438 M2 dated 9/12/03.

(\*\*) Tested in situ. Obra Derio (Bizkaia).

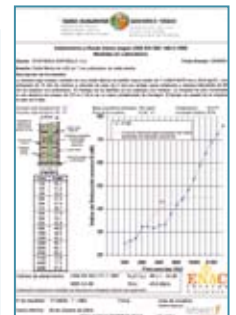
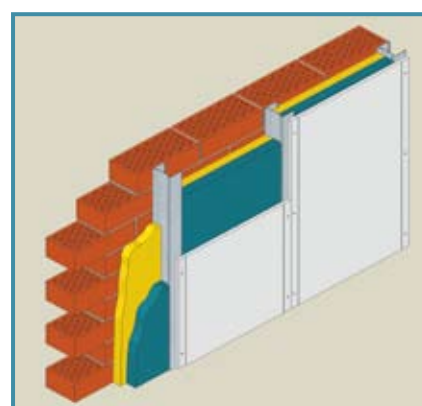
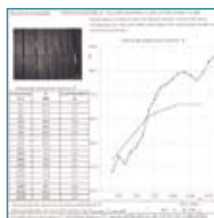
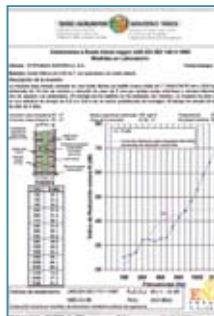
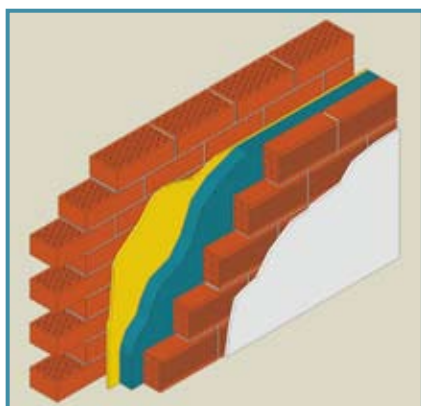
(\*\*\*) Certificate issued by Labein, Acoustics Area of the Quality Control Laboratory of the Basque Government (Vitoria-Gasteiz). IP 04638-IN-CM-7 II test report dated 28/10/04.

### Technical Code Requirement

CTE DBHR

D2m, nT, ATr (dBA) 30 - 51 dBA

# Building solutions







## 2. Inside partition walls

### THERMO ACOUSTIC INSULATION TESTING AND MEASURING

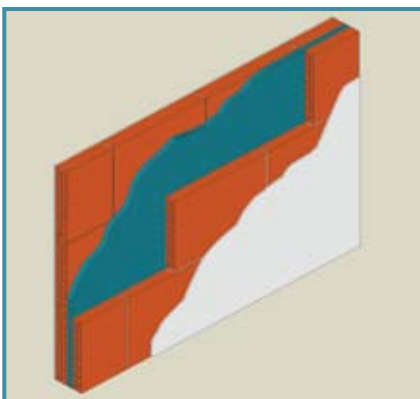
| DESCRIPTION OF BUILDING SOLUTIONS*                       | U (W/m <sup>2</sup> K) | R <sub>A</sub> (dBA)** | D <sub>nTA</sub> (dBA)** |                                    |
|--|------------------------|------------------------|--------------------------|------------------------------------|
| LP 1/2 foot + 30-40 mm Phono Spray S904 + LHDGF7         | 0.746                  | 58<br>60               | 51<br>54                 | CTE DBHR<br>DnTA = 50 dBA          |
| LHDGF9 + 30-40 mm Phono Spray S904 + LHDGF7              | 0.757                  | 53<br>55               | 48<br>51                 |                                    |
| PYL13 + 30-40 mm Phono Spray S904 + PYL13                | 0.892                  | 38                     |                          | CTE DBHR<br>R <sub>A</sub> = 33dBA |
| PYL13 + 60 mm Phono Spray S904 + PYL13                   | 0.617                  | 40                     |                          |                                    |
| PYL15+ PYL13 + 30-40 mm Phono Spray S904 + PYL13 + PYL15 | 0.806                  | 44                     |                          |                                    |
| PYL15+ PYL13 + 60 mm Phono Spray S904 + PYL13 + PYL15    | 0.574                  | 45                     |                          |                                    |

- (\*) LP: Perforated Brick placed at 1/2 foot, measurements: 24 x 11.5 x 7 cm.  
 LHDGF7: Large Format Hollow Double Brick, measurements: 70 x 50 x 7 cm.  
 LHDGF9: Large Format Hollow Double Brick, measurements: 70 x 50 x 9 cm.  
 PYL13 and PYL15: Laminated plaster panel 13 mm and 15 mm thickness.  
 All the solutions involved the placement of perimeter elastic bands and wet partitions were rendered on the outside with 7-10 mm of mortar.
- (\*\*) Tests and Certificates performed in the Laboratories of LABEIN, and ACUSTICARQ and in situ, approved on 6/08/00746 and on 6/08/00747 by the Colegio Oficial de Ingenieros Técnicos Industriales de Gipuzkoa [Official College of Industrial Engineers of Guipúzcoa].



## Partitions

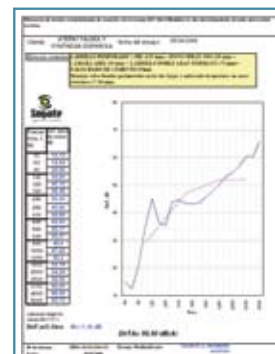
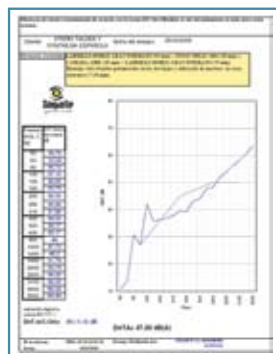
### SOLUTIONS WITH DIFFERENT TYPES OF BRICKS



### Technical Code Requirement

CTE DBHR

DnTA ≥ 50 dBA





# Partitions



## INSULATION IN PARTITIONS (DRY PARTITIONS) 48 mm CHANNEL

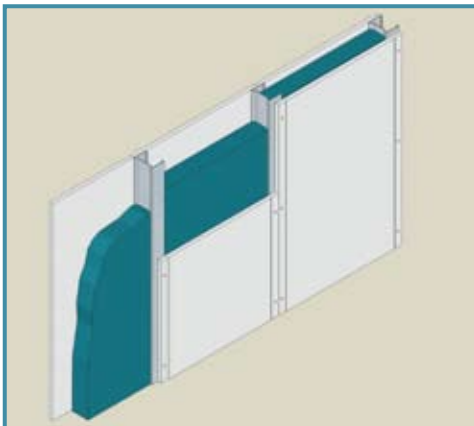
| Description  | U (W/m <sup>2</sup> K) | R <sub>A</sub> (dBA) |
|--|------------------------|----------------------|
| PYL 13 + air + PYL 13                                | 3.012                  | 36                   |
| PYL 13 + Phono Spray S904 + PYL 13                   | 0.853                  | 38                   |
| PYL 15 + PYL 13 + Phono Spray S904 + PYL 13          | 0.812                  | 43                   |
| PYL 15 + PYL 13 + Phono Spray S904 + PYL 13 + PYL 15 | 0.775                  | 44                   |

### SOLUTIONS WITH DIFFERENT TYPES OF LAMINATED PLASTER PANELS

### Technical Code Requirement

CTE DBHR

R<sub>A</sub> ≥ 33 dBA



## INSULATION IN PARTITIONS (DRY PARTITIONS) 70 mm CHANNEL

| Description  | U (W/m <sup>2</sup> K) | R <sub>A</sub> (dBA) |
|--|------------------------|----------------------|
| PYL 13 + air + PYL 13                                | 2.353                  | 38                   |
| PYL 13 + Phono Spray S904 + PYL 13                   | 0.598                  | 39                   |
| PYL 15 + PYL 13 + Phono Spray S904 + PYL 13          | 0.577                  | 42                   |
| PYL 15 + PYL 13 + Phono Spray S904 + PYL 13 + PYL 15 | 0.558                  | 45                   |

## Conclusions Phono Spray S904

- HIGH-DENSITY THERMO ACOUSTIC SPRAYED POLYURETHANE SYSTEM FOR INSULATION FROM AIRBORNE NOISE
- BUILDING SOLUTIONS FOR FACADES: CONTINUOUS THERMO ACOUSTIC IMPERMEABLE INSULATION (Poliuretano S Spray + Phono Spray S904) WITH AIRBORNE NOISE INSULATION BETWEEN 45 AND 60 dBA.
- Phono Spray S904 BUILDING SOLUTIONS FOR PARTITIONS:
  - CERAMIC PARTITIONS, INSULATION FROM AIRBORNE NOISE 46 TO 60 dBA.
  - LAMINATED PLASTER PANELLING FOR PARTITIONING, 37 TO 45 dBA.
  - REQUIREMENT OF CTE DB HR, DnTA > 50 dBA: COMPLIES!

# Phono Spray

HIGH-DENSITY  
THERMO ACOUSTIC  
POLYURETHANE  
SPRAYING

# S907



## Characteristics

Sprayed polyurethane system for thermal and acoustic insulation against impact and airborne noise in different building solutions.

It is an open-cell high-density foam, Applied Density:  $60 \pm 10 \text{ kg/m}^3$

Its porosity and elasticity make it an ideal material for insulation from impact noise from flooring or slabs.

Dynamic Stiffness:  $s' = 17.76 \text{ MN/m}^3$

It is a good thermal insulating material.  $\lambda = 0.036 \text{ W/mK}$ .

Resistance to Compression (10%). Between 30 – 40 KPa, depending on thicknesses.

Same advantages of application as in Poliuretano S Spray. Continuous system without thermal or acoustic bridges.

The required acoustic insulation from impact noise on premises should not be more than 65 dB. When one of the premises bounds with a premises of activities or installations, the overall level of pressure of impact noise will not be greater than 60 dB.

| PROPERTIES   | PHONO SPRAY S907   |
|--|--|
| APPLIED DENSITY UNE -EN 1602   | $55 \pm 10 \text{ Kg/m}^3$                               |
| RESISTANCE TO COMPRESSION UNE-EN 826 (30 mm thickness)                                     | 30 kPa*  |
| DIMENSIONAL STABILITY 24 h, -30, 60°C  | 0.5% Vol.  |
| CLOSED CELLS ISO 4590  | < 5%   |
| THERMAL CONDUCTIVITY COEFF. 20°C, 1 year   | 0.036 W/m K  |
| ACOUSTIC ABSORPTION COEFF. according to UNE-EN 20354:1993                                  | 0.32   |
| DYNAMIC STIFFNESS $s'$<br>According to UNE-EN 29052/1                                      | $17.76 \text{ MN /m}^{3**}$                              |
| DETERMINATION OF THICKNESS FOR FLOATING FLOOR INSULATING PRODUCTS. UNE-EN 12431:1999       | 1.6 mm (Thickness: 20 mm)*<br>3.1 mm (Thickness: 30 mm)* |
| DETERMINATION OF COMPRESSIVE CREEP. UNE-EN 1606:1997<br>EXPECTED DEFORMATION TO TEN YEARS. | 2.46 mm***<br>(7.2%)                                     |

(\*) Tested and certified, CEIS report no. LAT0011/10-1Rv1

Tested and certified, CEIS report no. LAT0011/10-1Rv1 (20 mm)

Tested and certified, CEIS report no. LAT0011/10-1Rv1 (30 mm)

(\*\*) Tested and certified for dynamic stiffness  $s'$  in Laboratorios APPLUS, report no. 08/32309500

(\*\*\*) Tested and certified, CEIS report no. LAT0011/10-2Rv1







## Tests

| SEPARATING ELEMENT                                    | U (W/m <sup>2</sup> K) | ΔL (dB) | L <sub>nw</sub> (dB) | R <sub>A</sub> (dBA) |
|---|------------------------|---------|----------------------|----------------------|
| STANDARD SLAB + 20 mm Phono Spray S907 + 50 mm MORTAR | 1.280                  | 14      | 60                   | 56                   |

Certificate issued by Labein, Acoustics Area of the Quality Control Laboratory of the Basque Government (Vitoria-Gasteiz). Test Report 90.2632.0-IN-CT-08/16 I and II dated 01-04-2008.

| SEPARATING ELEMENT  | U (W/m <sup>2</sup> K) | L'nTw (dB) |
|---|------------------------|------------|
| CONCRETE SLABBING + 20 mm Phono Spray S907 + 50 mm MORTAR | 1.280                  | < 65*      |
| CONCRETE SLABBING + 30 mm Phono Spray S907 + 40 mm MORTAR | 0.960                  | 53**       |

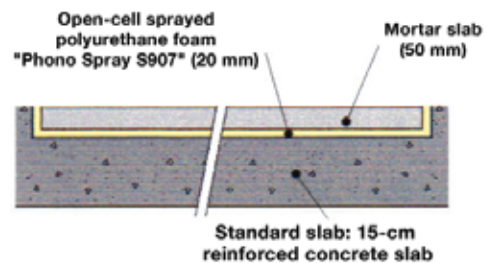
(\*) Estimated values with testing pending

(\*\*) In situ value. Report no. MRI-20102008-64, 20/10/2008

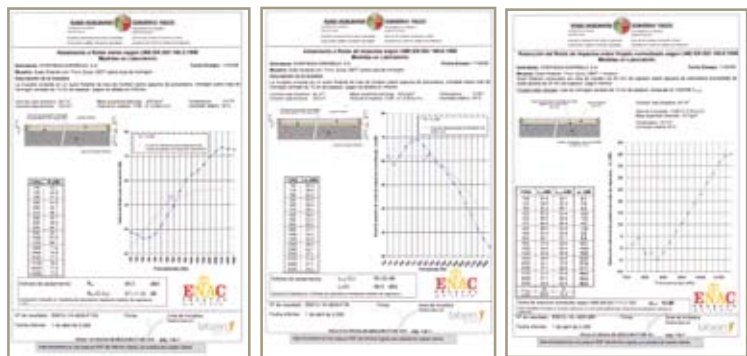
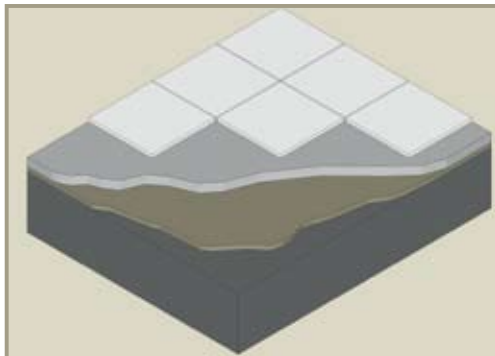
### Technical Code Requirements

CTE DBHR

L'nTw ≤ 65 dB



SLABBING + Phono Spray S907 20mm+ MORTAR 50 mm, standard slab



## Conclusions Phono Spray S907

- HIGH-DENSITY THERMO ACOUSTIC SPRAYED POLYURETHANE SYSTEM FOR INSULATION FROM AIRBORNE NOISE AND IMPACT ON FLOORING OR SLABBING.
- BUILDING SOLUTIONS FOR FLOORS OR SLABS L'nTW (DB) <65. COMPLIES WITH CTE DB HR.

# Phono Spray

INJECTION OF  
LOW DENSITY THERMO  
ACOUSTIC POLYURETHANE



## I905

### Characteristics

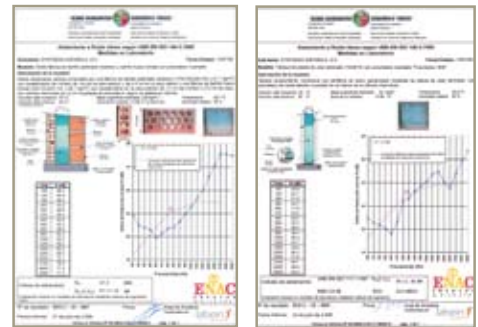
Injected polyurethane system for the Thermo acoustic Insulation of building solutions without insulation, being refurbished. This Phono Spray is used for thermo acoustic insulation by injection into non-insulated chambers in buildings being refurbished. Phono Spray I 905 provides 5-fold heat insulation, and in acoustic terms we comply with the current CTE DBHR, providing fast and simple refurbishing with no need for demolition of the existing solution.

| PROPERTIES  | PHONO SPRAY I905               |
|---|--------------------------------|
| APPLIED DENSITY UNE-EN 1602 (Thickness 100 mm)            | 12 ± 2 Kg/m <sup>3</sup>       |
| RESISTANCE TO COMPRESSION UNE-EN 826                      | 10 ± 3 kPa                     |
| DIMENSIONAL STABILITY 24 h, -30, 60°C                     | 0.5% Vol.                      |
| CLOSED CELLS ISO 4590                                     | < 10%                          |
| THERMAL CONDUCTIVITY COEFF. 20°C, 1 year                  | 0.036 w/m K                    |
| ACOUSTIC ABSORPTION COEFF. according to UNE-EN 20354:1993 | 0.5                            |
| AIR FLOW RESISTIVITY r according to UNE-EN 29053:1993     | 5-6 kPa s/m <sup>2</sup>       |
| DYNAMIC STIFFNESS s' according to UNE-EN 29052/1          | 4.83 MN /m <sup>3</sup>        |
| FIRE BEHAVIOUR EUROCLASSES UNE-EN 13501-01:2002           | B S1 D0 (In final application) |

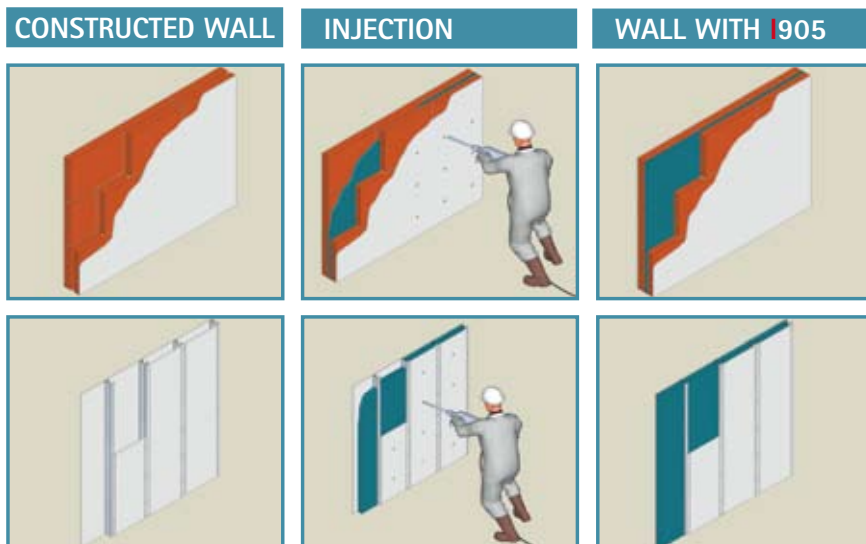
### Tests

| SEPARATING ELEMENT*                           | U (W/m <sup>2</sup> .K) | R <sub>A</sub> (dBA) |
|---|-------------------------|----------------------|
| LP 1/2 foot + Phono Spray I905 (100 mm)+ LHS5 | 0.356                   | 51.3                 |
| PYL15 + Phono Spray I905 (46 mm)+ PYL15       | 0.756                   | 33.3                 |

Certificate issued by Labein, Acoustics Area of the Quality Control Laboratory of the Basque Government (Vitoria-Gasteiz). Test Report 90.4950.0-IN-CT-08/38 II and III on July 21 and 24, 2008.



### Phases of application



# Advantages



## Poliuretán S Spray and Phono Spray

### THERMAL ADVANTAGES

- Poliuretán S Spray, the best thermal conductivity coefficient over time: less thickness.
- The least thickness: greatest usable surface.
- The greatest resistance to deterioration: window maintenance.

### ADVANTAGES WITH REGARD TO WATER

Poliuretán S Spray, continuous intermediate lining, needs no rendering and provides total guarantee. Watertightness certificate by CIDEMCO, report no. 12462.

### ACOUSTIC ADVANTAGES

Phono Spray, continuous system without thermal or acoustic bridges. Airborne and impact noise insulation: fulfils the requirements of the CTE DBHR.

### ADVANTAGES WITH REGARD TO HUMIDITY

Poliuretán S Spray, waterproof but transpirable: condensation-free solutions in any climate and without a vapour barrier. Vapour flow control. Water vapour Transmission certificate by CIES, report no. LAT0125/2007. Absence of diseases caused by surface and interstitial humidity.

### ADVANTAGES WITH REGARD TO FIRE

Poliuretán S Spray and Phono Spray, good behaviour in final application: safe final applications. Euroclass BS1D0.

### HEALTH ADVANTAGES

Polyurethane is a harmless material. According to the I.A.R.C., the International Agency for Research on Cancer, polyurethane foam is classified in Group 3, which encompasses all non-carcinogenic products.

### ENVIRONMENTAL ADVANTAGES

Maintenance of thermal properties throughout the building's service life. The most ecological product. Poliuretán S Spray only uses HFC as foaming gas that does not damage the ozone layer. Phono Spray does not use any foaming gas, and is therefore the most ecological polyurethane foam on the market.

### ADVANTAGES IN HARMONISATION AND CERTIFICATION

Poliuretán S Spray, unique insulating product with double certification possibilities. UNE 92120/1 and UNE 92120/2. Before installation (N systems Mark) and once installed on site (N Mark for installed products).

### ADVANTAGES IN ON-SITE PLACEMENT

Poliuretán S Spray and Phono Spray:

- Specialised labour. Guarantee of good installation.
- On-Site spraying. Rapid implementation. Easy solution for thermal bridges. No hoisting or warehouse space needed.
- Intermediate Continuous Coating: Insulation and waterproofing in a single application.
- No need for rendering, low indirect costs: Economic saving and best value for money.

### MARKET ADVANTAGES

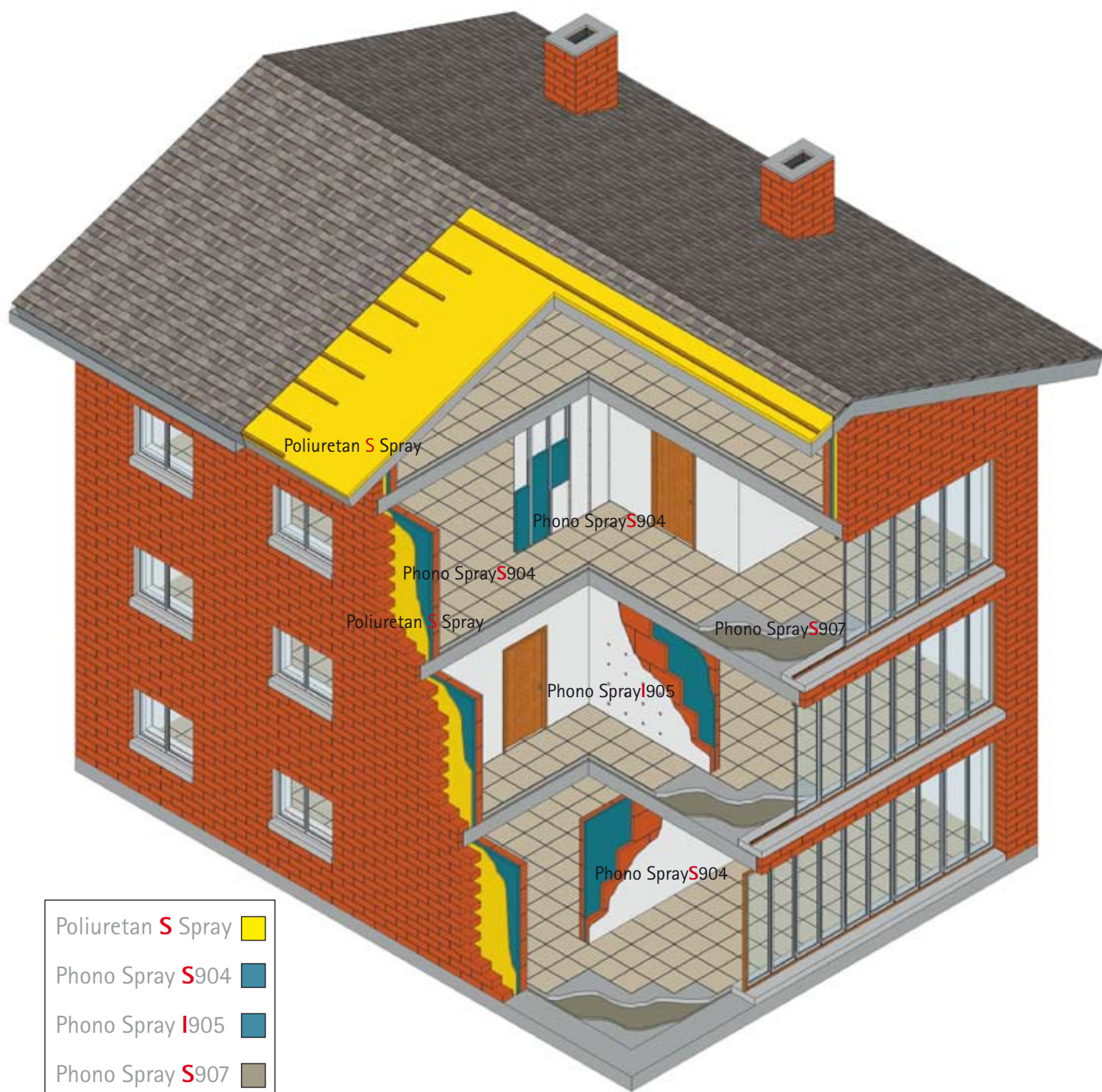
More than 60% of insulation in Spanish building is with polyurethane. Synthesia is present in more than 200 million m<sup>2</sup> insulated with Poliuretán S Spray, more than 35% of the market in Spain.



# Application



## Poliuretán S Spray and Phono Spray



The Poliuretán S Spray and Phono Spray are the best thermo acoustic solution for building



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