Phono Spray S-904

DIVISION: **PU SYSTEMS**

INTRODUCTION

Phono Spray S 904 is a two-component Polyurethane System comprising polyol, and isocyanate. The system is "in situ" sprayed and open cell low-density rigid foam with acoustic absorption properties is obtained. The application of Phono Spray S 904 in a constructive solution given improves the overall acoustic insulation of this solution.

Phono Spray S 904 system does not contain ozone depleting blowing agents (CFC and HCFC).

DESCRIPTION OF COMPONENTS

COMPONENT A : Mixture of polyols, containing catalysts and flame-retardants.

COMPONENT B : MDI (Methane diphenyl diisocyanate).

DENOMINATION OF COMPONENTS

COMPONENT A : Polyol Phono Spray S 904

COMPONENT B: ISOCYANATE H

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APPLICATIONS

The Phono Spray S 904 system is applied with a high-pressure spray equipment, which is heating outfitted, with a mixing ratio of 1:1 in volume. Its main application is the improvement in acoustic insulation to airborne noises for building enclosures such as partition walls and external buildings facades.

Application advantages:

- Total suppression of acoustic and thermal bridges. This system does not present joints or gaps since it is a continuously applied product.
- Good adherence to the substrate. Nor glues or adhesives are needed for its installation.
- Mobility. It is possible to get quickly to any site without having to transport or store bulky products like other acoustic and/or thermal insulating materials.

APPLICATION CONDITIONS

If the Phono Spray S 904 is applied on Poliuretan® S Spray, in case of vertical external facings, we got a waterproof thermo-acoustic continuous solution, due to the thermal and waterproofing properties of the foam with closed cell and the thermal and acoustic properties of open cell foam.

To achieve the desired thickness, it is recommended to apply the Phono Spray S 904 with the minimum number of layers projected to providing in this way excellent acoustics. For example, to 40mm, the maximum is two layers. In case of applying foam on PUR closed cell, it is advisable to do so in a single pass.

The adherence of Phono Spray S 904 system on Poliuretan® S Spray is excellent as well as other materials used in construction (concrete, ceramic, laminate plaster, wood, etc.) provided that these are clean, dry and free dust and oil.

The yield of the foam is influenced by different factors, which are listed below:

- Weather conditions: temperature, humidity, wind, etc…
- Substrate surface conditions: temperature and humidity.
- Adjustment of the equipment: appropriate ratio.

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GENERAL INSTRUCTIONS

It is recommended to apply the Phono Spray S 904 with the lowest possible layer to achieve the desired thickness, as long as the type of substrate and the conditions of humidity and temperature permit. It avoids intermediate skin and densification of the foam. As an example, to a thickness of 50 ± 5 mm advised in two passes when we apply on PUR and three past when applied directly. Being a low-density foam and open cell, the superficial appearance of the foam is more rough, appearing possible bubbles of water vapor on the surface, compared to the PUR closed cell. The application must be made on a layer of Poliuretan® S Spray that is not too hot to prevent the formation of bubbles. In case of applying the same day two systems, you must start implementing the Phono Spray S 904 on the Poliuretan® S Spray that was applied more time ago and not on which was applied immediately before changing a product by another.

During the application it is important to avoid the excessive overlapping of the successive sprayings that are necessary to cover the surface. This reduces means the irregularities in the sprayed surface and the thickness is better controlled.

During the application and depending on the weather conditions, certain quantities of steam forming white clouds could be released from the foam. These vapours do not involve any risk to human health. In any case, it is recommended to ventilate the area before proceeding with the work in order to avoid high vapour concentration that may result uncomfortable.

Phono Spray S 904 system is noticeably slower than Poliuretan® S Spray thermal insulator. For this reason, wait some minutes before checking the quality of the foam.

The recommended hoses temperature is in the range of 30-50ºC depending on the weather conditions. The minimum recommended substrate temperature during spraying is 5ºC.

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EQUIPMENT CLEANING

It is recommended to assign exclusive machines for the application of Phono Spray S 904 in order to avoid any source of contamination that may come from another polyurethane system used in the same equipment, thus bad purging of the machine can adversely affect the properties of the system to be projecting. In general the procedure to follow when changing from one product to another is detailed as follows:

1) When a few square meters remain from being sprayed with the thermal insulation system, the polyol pump must be changed from one drum to the other and start pumping Phono Spray S 904.. One product will displace the other inside the hose while the remaining area is sprayed with the thermal insulation.
2) Briefly (depending on hose length) Phono Spray S 904 will start going out from the gun. This moment is easily detected since Phono Spray S 904 is blue.
3) When Phono Spray S 904 starts to foam it is advisable to reject the initial foam, it could still be contaminated with the thermal insulation product Poliuretan® S Spray.
4) When it is proved that the product is correctly formed (bluish colour, flexible tact) it is possible to start with the application.

Carrying out the change from one product to the other in this way, generation of residues will be avoided.

When the thermal insulation product Poliuretan® S Spray is going to be sprayed again, it is necessary to repeat the process changing a product by the other and checking the correct formation of the foam, this time it must be yellow. It is possible that during the first applied meters of Poliuretan® S Spray , small lines of blue colour corresponding to small quantities of the product Phono Spray S 904 . This small colour changes do not affect of significant by to the foam quality can be observed.

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CHARACTERISTICS OF THE COMPONENTS

CHARACTERISTICS	UNIT	H	Phono Spray S 904
Specific weight 25ºC	g/cm^3	1,23	1,10
Viscosity 25ºC	mPa.s	230	250
NCO Content	%	31	-

TECHNICAL DATA OF SYSTEMS

Measured in a test recipient at 22ºC at the indicated mixing ratio and according to our Standard Test (MAN-S01).

MIXTURE RATIO A / B: **100/100 by volume**
100/110 by weight

SPECIFICATION	UNIT	Phono Spray S 904
Cream Time	s	5 ± 1
Gel Time	s	12 ± 2
Free rise density	g / l	23 ± 3

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FOAM PROPERTIES

PROPERTIES	UNIT	Phono Spray S 904
Applied average density UNE-EN 1602	Kg/m^3	12 ± 2
Compressive Strength UNE-EN 826	KPa	10 ± 3
Dimension stability -30ºC 24 hours 60ºC	% Vol.	0.5 0.5
Closed cell content ISO-4590	%	<10*
Thermal Conductivity Coefficient 20ºC 10 days UNE-92202/89	W/mºC	0.035-0.040*
Water vapour transmission coefficient (μ) UNE EN 12086:1998	-	4**
Sound Absorption Coefficient UNE EN 29053:1993	-	0.5
Air Flow Resistivity r UNE EN 29053:1993	$Kpa\ s\ /m^2$	5-6***
Dynamic Stiffness s' UNE EN 29052/ 1	$MN\ /m^3$	4.83****

*Data obtained in our facilities.
** Certified by Applus in Barcelona file number: 5046140 dated December 3rd 2005
*** Certified by CEIS file number: LAT0067/08 dated June 25, 2008.
**** Certified by APPLUS file number: 08/32309712 dated July 30, 2008.

FIRE REACTION TEST

CHARACTERISTICS	Phono Spray S 904
*Reaction to fire UNE EN 13501-01:2002	Euroclass B S1 D0

* Constructive solution of end-use application.

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ACOUSTIC ABSORPTION TEST

The sound absorption of Phono Spray S 904 was determined at different frequencies, according to standard UNE-EN 20354:1993, in a reverberating chamber. The following table shows the obtained results as well as sound absorption of a closed cell polyurethane foam for thermal insulation such as Poliuretan® S Spray:

Frequency (Hz)	**Acoustic absorption coefficient UNE-EN 20354:1993**	
	Phono Spray S 904*	Closed cell PU**
125	0.20	0.12
250	0.40	0.18
500	0.80	0.27
1000	0.60	0.19
2000	0.40	0.62
4000	0.50	0.22
NRC***	0.50	0.32

* Certified by Applus in Barcelona file number 3009439 dated October 22nd, 2003.
** Data extracted from the technical information published by ATEPA (www.atepa.org).
*** NRC states for the Noise Reduction Coefficient.

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ACOUSTIC INSULATION TEST

Acoustic insulation test for airborne noise have been carried out according to UNE-EN ISO 140-3:1995 in a vertical faces type facade and type watershed between neighbours.

FACADES

A constructive solution has been determined consisting of a vertical ceramic blocks where Poliuretan® S Spray and Phono Spray S 904 were applied and finished later by badges of standard laminated plaster. The results are shown below and they are compared to the ones obtained with Poliuretan® S Spray :

DESCRIPCTION OF THE FACE (FAÇADES)	Sound reduction index UNE-EN ISO 140-3:1995	
	R_a (dBA)	R_w (dB)
Ceramic blocks section* + 3.5 cm Poliuretan® S Spray **	46.7	47 (0 ;-4)
Ceramic blocks section* + 3.5 cm Poliuretan® S Spray + 5 cm Phono Spray S 904+ 10 cm air chamber + Laminated plaster of 13 mm***	60.3	62 (-2 ;-8)

* Ceramic blocks of 28x13x9 cm with an average weight of 3.5 Kg.
** Certified by Applus in Barcelona file number 3009437 dated October 22nd, 2003.
*** Certified by Applus in Barcelona file number 3009438 M2 dated December 9th, 2003.

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PARTITION BETWEEN NEIGHBORS

A constructive solution has practised for partition between neighbours consisting of a vertical ceramic blocks where Poliuretan® S Spray and Phono Spray S 904 were applied and finished later by another vertical ceramic block.

DESCRIPCTION OF THE FACE (PARTITION BETWEEN NEIGHBORS)	Sound reduction index UNE-EN ISO 140-3:1995	
	R_a (dBA)	R_w (dB)
Ceramic blocks section* + 1.0 cm Poliuretan® S Spray + 4.0 cm Phono Spray S 904 + Ceramic blocks section *	45.6**	46 (-1 ;-5)**

* Double hollow brick of 31.5 x 14.5 x 7 cm with an average weight of 2.5 Kg.

** Certified by the Acoustic Area from the Laboratory of Control Laboratory of the Basque Government (Vitoria). File number PI 04638-IN-CM-7 II dated October 28th , 2004.

This solution has been compared with another identical constructive solution which has filled the space between the two partitions vertical ceramic blocks with rock wool BX SPINTEX 623-70 (40 mm thickness and density of 65 kg/m3). The result is Rw of 45 dBA *.

(*) Certified by the Acoustic Area from the Laboratory of Quality Control of the Basque Government (Vitoria). File number PI 04638-IN-CM-7 I dated October 21st , 2004.

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PARTITION BETWEEN PROTECTED ENCLOSURES

We have conducted test of soundproofing airborne noise as standard UNE-EN ISO 140-3:1995 and UNE-EN ISO 140-4, testing and measuring laboratory and in situ in dividing between enclosures protected , similar to dividing between neighbours.

DESCRIPCTION OF THE FACE (PARTITION BETWEEN NEIGHBORS)	Soundproofing to airborne noise	
	R_a (dB)	DnT,A (dBA)
LP ½ PIE* + 3-4 cm Phono Spray S 904 + LHDGF7** Both carry leaves 7-10 mm mortar by the outside and perimeter bands.	58-60	51-54
LHDGF9** + 3-4 cm Phono Spray S 904 + LHDGF7** Both carry leaves 7-10 mm mortar by the outside and perimeter bands.	53-55	48-51

* Perforated brick placed ½ foot of 24x11,5x7 cm.
** Hollow brick double-wide format of 70x50x7 cm and 70x50x9 cm.
Certified by LABEIN labs and "in site" file number 6/08/00746 and 6/08/00747 by Official College of Industrial Technical Engineers of Guipuzcoa.

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SAFETY RECOMMENDATIONS

Properly handled, Poliuretan® S Spray system does not present significant risks. Avoid contact with eyes and skin. The instruction given in the Safety Data Sheet must be followed during the manufacturing and handling of the system.

SUPPLY OF THE PRODUCT

Normally, Phono Spray S 904 is supplied in non-returnable steel drums of 50 and 200 litres (blue colour for component A and black colour for component B).

STORAGE AND USAGE RECOMMENDATIONS

Components A and B are sensitive to moisture, and must be stored in hermetically sealed drums or hermetic containers. Storage temperature must be kept between +15ºC and +25ºC. Avoid lower temperatures that may build up crystallizations in the isocyanate, as well as higher temperatures that may alter the polyol and produce swelling of the drum.

Properly stored, the shelf life is 3 months for the Component A (polyol) and 9 months for the Component B (isocyanate).

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ANNEX: APPLICATION TROUBLESHOOTING

Our Technical-Commercial customer service will give you advice for any queries you may have on the preparation of this product. Nevertheless, some of the problems that may appear during the process are outlined below:

PROBLEM	POSIBLE CAUSE	SOLUTION
Uneven atomisation.	Needle /gun wrongly adjusted or dirt in the mixing chamber.	Adjust the position Clean the chamber.
Coloured streaks.	Bad mixing due to components obstruction or differences in viscosity.	Check pressures, fix obstruction. Adjust and raise temperatures.
Poor and closed atomisation.	High component viscosities. Cold temperature.	Rise temperatures and pressures.
Atomising too open and mist formation.	Excess of air in gun tip. Excessive pressure of mixing.	Reduce air passage. Reduce a little the pressure.
The material reacts slowly and it falls off.	Cold surface.	Rise hose heating.
Excessively fast material, uneven finishing with mist.	Pressure excess.	Reduce the air pressure in the gun and the mixing pressure.
The material is granulated as it gets on the surface and obstructs the gun.	Temperature excess.	Reduce hose heating.
Random shape bubbles are formed in the surface of the material.	It is applied on a surface that is too hot.	Wait the surface to cool down.
	Contamination with the formerly used product.	Let the presently used product to go through the hose a little bit more.

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