



TECHNICAL DATA SHEET POLIFORMA 3214 (POLYOL)/ISOFORMA 31 (ISOCIANATE)

SYSTEM OF TWO COMPONENTS FOR THE MANUFACTURE OF RIGID FOAM OF POLYURETHANE BY PROJECTION.

1. DENOMINATION AND DESCRIPTION OF THE SYSTEM

The POLIFORMA 3214/ISOFORMA 31 system is a polyurethane foam for hot projection using suitable machines capable of dosing and mixing the two components in volumetric ratio 100:100. The foam has been developed for use as thermal insulation with a very good water tightness and good adherence to the substrate. Its application is suitable for vertical walls and ceilings. No suitable for floors.

- **POLIFORMA 3214 polyol component:** Mix of polyols with reactive -OH group, containing catalysts, flame-retardants, blowing agents (fluorinated gases free) and foam stabilizing agents.
- **ISOFORMA 31 isocyanate component:** Diphenylmethane diisocyanate (MDI), with reactive groups -NCO.

It is recommended to stir before use. Both components are formulated so that they do not have to be added. It only admits pigments supplied by Formulations and in the indicated proportions.

2. APPLICATION AND CONDITIONS OF APPLICATION

Each polyurethane system, depending on the technology used in its manufacture, will require a different treatment for its correct and optimal performance. Not all systems are equal.

The foams of FORMULACIONES, S. A. are a technical product that, in order to obtain the maximum performance, it is important to control the following parameters:

- **Weather conditions**
- **Condition of the substrate (cleaning, temperature and humidity)**
- **Optimum state of the machine (pressures and temperatures work correctly throughout the circuit of the two products)**
- **Machine parameters are to be adapted to the product.**

In case the parameters are not within our work requirements and forecasts, the polyurethane system may manifest unwanted pathologies. In case of not fulfilling our demands and working within all the parameters, FORMULACIONES, S.A. will not be responsible for the results of the product.

2.1. Precautions before applying

The substrate must be clean and of sufficient consistency and porosity, so that no removal of the substrate takes place and the adhesion is correct.

The temperature must be adequate both in the substrate and in the environment, to avoid large thermal jumps between the hot product and the environment in which it is worked.

The condition of the machine must be correct in terms of temperature contribution to the product, the pressure must work in the entire circuit and the flow rate must be correct, without total or partial clogging.



Once all these points have been verified, the product will be recirculated and tempered to proceed with the work. **Do not work at higher than recommended temperatures, as thermal jumps and thus partial or total debonding would occur, especially in encounters of materials of different natures (e. g. brick-concrete), as they may have different surface temperatures and shrinkage coefficients.**

It is recommended that in angular joints of different elements they are sealed with one hand perpendicular to the angle, and thus avoid possible detachments at this point.

The application will begin by applying a very thin layer, 1 mm of maximum thickness, which will be used to temper the substrate and as a primer layer. You must make sure that the first layer is completely cured before applying the next one. The colder the substrate is, the more short hands should be applied to temper it and avoid the thermal jump, always without exceeding the recommended temperature of each product. Respect the indicated temperature. The colder, the less temperature for the product.

Is important to adjust the application pressure and distance during the work. If one layer is in growth phase and another is applied on it at a high pressure and very close by, the growth of the first layer may be affected and cause a rough finish of the foam and worsening of compressive strength.

The application will be made at a distance of between 0.7 and 1 m. The layers have to be applied crossed, before has been finished the cured previous coat and with a layer thickness between 1.5 and 2 cm. The optimum moment is when it is almost solid and thus collaborated with the gas release. If it is projected cold, will be generated the air release of the first hand and will decrease the adhesion between layers.

2.2. Conditions of application

Conditions of application	Working values
Products	
Temperature	Product: between 30 and 35°C tempered by recirculation. It is recommended that the polyol have a temperature of 2°C above isocyanate. Hoses: between 30 and 35°C to preserve the temperature of the product.
Pressure	1.200 to 1.500 psi (83-103 bar). Depending on the temperature.
Ratio	100:100 v/v. To maintain this ratio, it is recommended that the machine is well maintained, that the pressures are correct and that the pumps work perfectly.
Weather conditions for projection	
Temperature	Between 5 and 30°C.
Relative humidity	Less than 85%
Wind	Less than 30 km/h.



Conditions of application	Working values
Substrate	
Temperature	Between 10 and 40°C. It is important to temper the substrate with a small amount of product in thin layers.
Humidity	Porous supports: less than 20%.
	Non-porous substrates: check that there is no surface condensation.

The pressure and temperature must be coordinated for a good application.

The substrate must have sufficient tensile strength to withstand the contractions that occur during foam formation.

2.3. Recommended Uses

Foam for use as thermal insulation recommended to vertical walls and covered by the lower part. Do not apply on floors, trafficable roof or surfaces that are subject to loads. It is not designed for floors.

Apply preferably on bare support, without plastering or nasturtiums, to improve the adherence and avoid the formation of condensations produced according to the state of the mortar. In case of existing plastering or nasturtiums, it is necessary to make sure that these are not additivated, since the hydrophobic ones and others additives can work like release agent. If the mortar is poured or badly dosed, it is very possible that the polyurethane will start it from the substrate.

Polyurethane foam is not UV resistant. For this reason, in those applications where the foam is exposed, it must be protected by applying the HIDROFORMA H2V0 or by using other protectors.

2.4. Pathologies

In case of NOT following the instructions given, the foam will not behave correctly and will not perform well in the construction system in which it is incorporated. **It is important to choose the right polyurethane system for the construction system.** It is the responsibility of both the applicator and site management to evaluate all parameters for a correct selection and execution of the work.



Parameters consider to avoid pathologies	Pathology
Components temperature	Non-homogeneous temperature throughout the product: the dosage of the product will be different at all times.
	Large temperature difference between the two components: bad dosage.
	Lower temperatures: bad dosing and slower foam that will be off-hook.
	Higher temperatures: faster reaction, structure breakage and foam shrinkage.
Components pressure	Difference of pressures: bad dosage and possibility of contamination of the ducts.
	Very low pressure: the product reaches the reacted support; it may not even reach it. Poor mixing and not opening the gun.
Components ratio	Higher ratio of polyol: white foam, slower curing and softer. Foam shrinkage. Sticky surface for the first few hours.
	Higher isocyanate ratio: more yellowish, harder, thicker foam with higher density and higher consumption. Worse grip.
Room temperature	WARNING. Working outside the ranges may cause the reaction to fail. Do not raise the temperature of the components more than recommended when it is cold, as this will also cause great thermal bridge between product and substrate. This will lead to poor product adhesion and shrinkage of the foam and the foam.
Room humidity	Upper humidity: Formation of future condensation and bubbles.
Wind speed	Higher wind speeds: product loss and worse performance. Heat loss when projecting
Substrate temperature	Great difference between substrate and product temperature (heat jump): poor adhesion.
	Low temperature: slowdown of the reaction and dropping of the foam.
	High temperature: appearance of bubbles, de-structuring of the foam and contraction to medium and long term.
Substrate humidity	Greater moisture of the substrate: poor adherence to the substrate and future moisture.
Nature of the substrate	Spraying onto an inappropriate substrate may result in poor product adhesion, bubble formation, dampness and even the foam tearing off the substrate from the surface where it is applied. It is important for adhesion that the substrate has open pores.
Operating distance	Longer distance: Curing of the foam before reaching the support, loss of consistency and structure and detachment of the foam.
	Shorter distance: late curing of the foam, formation of drippings and vertical sagging.



Parameters consider to avoid pathologies	Pathology
Layers. They will be applied in different ways according to the nature of the system	Not applying the primer layer can cause the foam to peel off the wall and contract due to the temperature difference between the substrate and the polyurethane system.
	A higher thickness in the primer layer can lead to poor product adhesion due to the fact that the thermal jump affects foams with a higher core.
	Higher number of layers: higher density, better stability and resistance to compression and higher consumption.
	Lower number of layers: lower density, lower stability and resistance to compression and lower consumption and risk of take-off.
	To be noted: Each system tolerates the next layer in a different way.

3. STORAGE

The material is normally supplied in non-returnable metallic drums, yellow for the polyol and red for the isocyanate.

The optimum storage temperature is 10 to 25°C. The components are sensitive to moisture, and must always be kept in drums or hermetically sealed containers and the containers must be protected against the entry of moisture and especially against rain.

Under suitable storage conditions and in the original containers, the optimal period of consumption is 3 months for the polyol component and for the isocyanate component.

4. CAUTION MEASURES

The Material Safety Data Sheets for each of the Products must be taken into account when handling the System.

Avoid contact with skin and eyes, as it may cause irritation. For all jobs, the use of safety glasses and protective gloves is mandatory. In addition, during the application it is mandatory to use respiratory protection.

Splashes on the skin should be removed immediately by washing thoroughly with water and neutral soap. It is recommended to treat with a skin cream of the areas of the affected skin later and seek medical attention.

Splashes of the product in the eyes should be removed immediately by washing carefully with clear and abundant water. Request specialized medical assistance.



5. SPECIFICATIONS OF THE POLYURETHANE SYSTEM

5.1. Physical data of the components

Characteristics	POLIFORMA 3214	ISOFORMA 31	Unit
Specific weight at 25°C	1,08	1,23	g/cm ³
OH Index	200±20	-	mgKOH/g
NCO Content	-	31±1	%weight
Viscosity a 25°C	320±60	200±60	cP
Water content	3,95±0,10	-	% weight

5.2. Reaction profile and free density

Foaming test in glass at 25°C and ratio of the mixture 100:100v/v:

Characteristics	Value	Unidad
Cream time (CT)	4±1	s
Gel time (GT)	8±2	s
Tack free time (TFT)	9±2	s
Free density (FRB)	31±3	kg/m ³

These data correspond to those obtained in our laboratories, by foaming in free, according to the procedures of our quality system and under the conditions described above. During the projection, these data can vary depending on the climatic conditions, the thickness of the layers and the mixing ratio. The latter may detract from the quality of the product. A change in the result depends more on the handling method and working conditions than on the foam itself. If the work is carried out according to the manufacturer's parameters, the systems function correctly.


Any modification of the system, out-of-parameter use or use in solutions for which it is not designed shall be at the user's own risk.

6. FOAM PROPERTIES STATED ON THE CE MARKING.

Characteristics	POLIFORMA 3214	Unit	Norm
Closed cell content	≥ 90	%	ISO 4590
Thermal conduction at 10°C (λ _{max} : aging value)	see performance chart	W/mK	EN 14315-1
Reaction to fire (Nude foam)	CLASS E	-	EN 13501-1
Water absorption in short term	≤0,20	kg/m ²	EN 1609



7. CE MARKING

 0370			Type of facing: none or diffus on open			Type of facing: none or diffus on open		
FORMULACIONES, S.A. Autovía Sevilla-Málaga, km 11 P.I. Polysol, c/ C, nº 6, Apdo. 331 41500 Alcalá de Guadaíra (Sevilla)			Thickness	Declared aged thermal conductivity W/m·K	Thermal resistance level (R_D) m²·K/W	Thickness	Declared aged thermal conductivity W/m·K	Thermal resistance level (R_D) m²·K/W
14 DdP n: CPR-18-3001 www.formulaciones.es			30 mm	0,032	0,90	120 mm	0,032	3,75
EN 14315-1:2013 POLIFORMA 3214/ISOFORMA 31 Product – Thermal isolation in buildings Reaction to fire – E (valid for all thicknesses) Water permeability (expressed as short term water absorption by partial immersion): max. 0,20 kg/m² Thermal conductivity: see performance chart. Compressive strength: Durability of reaction to fire against ageing/degradation: reaction to fire does not decrease with time. Durability of thermal resistance against ageing/degradation: see performance chart. Durability of compressive strength against ageing/degradation: Continuous glowing combustion: no harmonized test method available. PU EN 14315-1-CCC4-CT3(25)-GT6(25)-TFT8(25)-FRB31(25)-W0,2			35 mm	0,032	1,10	125 mm	0,032	3,95
14 DdP n: CPR-18-3001 www.formulaciones.es			40 mm	0,032	1,25	130 mm	0,032	4,10
14 DdP n: CPR-18-3001 www.formulaciones.es			45 mm	0,032	1,40	135 mm	0,032	4,30
14 DdP n: CPR-18-3001 www.formulaciones.es			50 mm	0,032	1,55	140 mm	0,032	4,45
14 DdP n: CPR-18-3001 www.formulaciones.es			55 mm	0,032	1,70	145 mm	0,032	4,60
14 DdP n: CPR-18-3001 www.formulaciones.es			60 mm	0,032	1,85	150 mm	0,032	4,75
14 DdP n: CPR-18-3001 www.formulaciones.es			65 mm	0,032	2,00	155 mm	0,032	4,90
14 DdP n: CPR-18-3001 www.formulaciones.es			70 mm	0,032	2,20	160 mm	0,032	5,05
14 DdP n: CPR-18-3001 www.formulaciones.es			75 mm	0,032	2,35	165 mm	0,032	5,20
14 DdP n: CPR-18-3001 www.formulaciones.es			80 mm	0,032	2,50	170 mm	0,032	5,40
14 DdP n: CPR-18-3001 www.formulaciones.es			85 mm	0,032	2,65	175 mm	0,032	5,55
14 DdP n: CPR-18-3001 www.formulaciones.es			90 mm	0,032	2,80	180 mm	0,032	5,70
14 DdP n: CPR-18-3001 www.formulaciones.es			95 mm	0,032	2,95	185 mm	0,032	5,85
14 DdP n: CPR-18-3001 www.formulaciones.es			100 mm	0,032	3,15	190 mm	0,032	6,00
14 DdP n: CPR-18-3001 www.formulaciones.es			105 mm	0,032	3,30	195 mm	0,032	6,15
14 DdP n: CPR-18-3001 www.formulaciones.es			110 mm	0,032	3,45	200 mm	0,032	6,35
14 DdP n: CPR-18-3001 www.formulaciones.es			115 mm	0,032	3,60			



NOTE: The recommendations and data in this document are results of knowledge of Formulaciones and current experience. Formulaciones performs quality controls, under ideal conditions, on all products before shipment to ensure compliance with the parameters established on the Technical Data Sheets. Certificate of analysis is available to all users who request it. The products of Formulaciones are not a finished product, but those that require a work on the part of the client to obtain the final properties in the present document. All use, handling and storage of the product may alter the final properties of the product, so it is the customer's responsibility to follow the instructions indicated. Formulaciones manufactures its own products, therefore it reserves the right to make formula modifications that may or may not lead to changes in the properties of the products. Therefore, it is recommended to own the latest version of the Technical Data Sheet and to have read it. Depending on the application and the conditions under which it is carried out, parameters may vary from the measured in our laboratories. Due to the large number of variables that can be given during the application, all the recommended actions, whether spoken or written, are not a guarantee of the proper operation of the product. Client should always test the product before applying it.