

Instructions for using PUREX AM polyurea system

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1 Purpose and scope of using

PUREX AM is a two-component, solvent-free coating system. The product is characterized by high reactivity and thus a suitable high-pressure aggregate is needed to process it. PUREX AM is a construction product intended for surface protection of concrete. Other coating applications are:

- Protection of metal surfaces,
- Protection of plastic surfaces,
- Surface renovation of bitumen roofs,
- Hydroinsulation of tanks (including drinking water).

Coating with PUREX AM must be in accordance with the technical design developed for a specific application including:

- requirements of relevant standards and applicable technical and construction regulations, in particular the Regulation of the Minister of Infrastructure of April 12, 2002, regarding technical conditions that should be met by buildings and their location (the Journal of Laws, no. 75 of 2002, item 690, as amended).
- This manufacturer's instruction.

This product is subject to assessment and verification of constancy of performance in accordance with harmonised standard PN EN 1504-2: 2006. The sprayer manufacturer is obliged to apply standard PN EN 1504-10: 2006 and to declare the product performance in accordance with it.

2 General processing rules

The polyurea system consists of two liquid components: the first, based on multifunctional amines, is designated as A (PUREX AM Comp. A), while the second, isocyanate, is designated as B (PUREX AM Comp. B).

During application, the components are mixed using a high-pressure spraying aggregate. The components are mixed in the chamber of the spraying gun, and then the reaction mixture is sprayed under high pressure. In order for the coating to obtain the declared mechanical parameters, the processing conditions must be observed.

Before spraying, it is necessary to thoroughly mix A raw material in a barrel. We recommend using a pneumatic drum mixer for one hour before spraying. The aggregate must be filled with polyurea only after mixing the raw material.

NOTE: Special attention must be paid when preparing the aggregate for working with the Purex AM system, especially when replacing components in the machine: do not allow the contamination of components with the remains of another system previously processed in the machine or agents used for maintenance - even low number of contaminants can change the properties of the coating. Therefore, when exchanging components, it is recommended to empty the transfer pumps to the maximum and to create an airbag before placing the pumps in the containers with the system components and push out the existing contents of the system.

In order to achieve the proper parameters of the coating, the following processing conditions must be observed:

- The temperature of the components in barrels before spraying must be 40-50°C. It can be obtained by recirculation using the heaters in the aggregate. Another way is the use of heating mats.
- The temperature of the components reaching the head during spraying must be 65-80°C.

It is advisable to perform a spray test on a dry surface and an adhesion test before starting the actual spraying. Make sure that the processed material is homogeneous, do not create blisters on the surface and whether the material cures at the right time. The descriptions of common problems and their causes are described below:

- **Non-reactive, sticky material** - A component has not been mixed well enough, error in mixing the material during spraying
- **Coating perforations** - too thin layer of the primer, the temperature of the surface is too high (above 35°C).
- **Breakable coating** - the temperature of the surface or the environment is too low.
- **No adhesion to the surface** - poor surface preparation, incorrect spraying parameters, material was not mixed enough before spraying
- **Formation of bubbles on the surface (from 1 mm to several dozen cm in diameter), local material detachment** - "closure" of water, humidity in the surface under the coating, leakage of the coating, water infiltration for insulation.
- **Low mechanical parameters** - insufficient mixing of material during spraying.
- **Too wavy/rough surface** - too small/large distance of the gun from the surface.

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The mixing ratio of A and B components of 1:1 by volume must be strictly observed. Any deviation from this rule may result in deterioration of mechanical parameters. Monitoring the pressure during operation is the easiest way to control the mixing ratio. They should be similar for both components. It is also worth paying attention to the material spraying quality. The cloud should be homogeneous without "streams" of the non-sprayed reaction mixture. This may be a symptom of a dirty spray gun. The problem is solved by basic maintenance procedures. Spraying with an inoperable head can reveal an incorrectly mixed material and a number of associated complications.

3 Preparation of the surface before spraying:

Polyurea is a material that can be used on many types of surfaces, from concrete to steel, from tar paper to plastic. Preparation of each of the surface requires an individual approach, but there are common points such as: cleaning the surface of dirt, loose fragments, oils, lubricants and other agents that impair adhesion. The surface must be even and slightly matted. In many situations, good adhesion can be obtained thorough cleaning and matting of the surface. When processing PUREX AM, it is necessary that the temperature of the surface is at least 3°C higher than the dew point temperature. When it is suspected that water can be closed under the coating (e.g. damp thermal insulation), it is absolutely necessary to make ventilation chimneys.

Concrete - spraying on concrete with humidity content below 4% does not require additional interlayers. In case of higher humidity of the surface, it is necessary to apply primer. The recommended primer is PUR PRIMER C. It is allowed to use high-pressure washers, shot peening, sandblasting, milling or grinding. Oily areas must be cleaned with emulsifying agents designed for this purpose.

Steel, cast iron, galvanic coatings, non-ferrous metals - it is necessary to thoroughly clean the surface, you can use pressure washers and other mechanical methods for this purpose. The surface must be free from residues of coatings and dust. Special attention should be paid to dirt from greases and waxes. If necessary, you can use solvents for cleaning. In order to improve the adhesion, apply sandblasting on the surface. In the case of spraying on a galvanized surface, aluminium or when we are not able to ensure proper preparation of a structure to being sprayed, it is advisable to use an epoxy primer available under PRIMER ZN name.

Bitumen surfaces - before starting work, check the adhesion of tar paper to the surface. All cavities must be filled. If blisters are visible, cut them out and then dry and cover the resulting cavity (for example with undercoat tar paper). Cleaning can involve burning with a burner (this removes organic dirt). Loose fragments of mineral topping must be washed away. We recommend using PUR PRIMER C for this type of substrate.

4 Optimal ambient conditions

- The recommended ambient temperature of spraying is: +5°C to +40°C
- Air temperature outside: -35°C to +40°C
- Recommended surface temperature: +5°C to +35°C

Dew point temperature:

This is the temperature at which condensation occurs. The surface temperature during application must be at least 3°C higher than the dew point temperature. The dew point temperature can be determined by measuring the meter or reading from the table according to the following diagram:

Air temperature = **21°C**

Air relative humidity = **75%**

The temperature of the dew point determined from the table = **16.4°C**

Do not apply the coating if the surface temperature is less than **19.4°C** ($16.4^{\circ}\text{C} + 3^{\circ}\text{C} = 19.4^{\circ}\text{C}$). The table of the dew point temperature on relative air humidity is at the end of the instruction.

5 Thickness of the spraying layer

To ensure proper tightness, the coating must be obtained with minimum of 2 layers applied in a cross-shaped way. The thickness of one layer must be approximately 1mm. The system cannot be thinner than 2 mm. To ensure proper adhesion between the layers, the next layer cannot be made with a time interval of more than 2 hours. If this limit is exceeded, use PUR PRIMERA C as a primer or matte the coating. In the event of a spraying break (> 2 hours), a 30 cm wide "overlap" must be made before starting again.

6 Personal protection

With correct application and compliance with the basic rules of occupational health and safety, PUREX AM system does not threat to human life and health.

The details of the safe use of the system components can be found in the Material Safety Data Sheets for both components of the system. Follow the recommendations contained therein.

When applying the foam, wear protective clothing and gloves - in particular, full face and respiratory protection must be used.

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DEW POINT TEMPERATURE WITH RELATIVE HUMIDITY

Air temperature	AIR RELATIVE HUMIDITY (%)											Air temperature
	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	
2°C	-7.7	-6.6	-5.4	-4.4	-3.2	-2.5	-1.8	-1.0	-0.3	0.5	1.2	2°C
4°C	-6.1	-4.9	-3.7	-2.6	-1.8	0.9	-0.1	0.8	1.6	2.4	3.2	4°C
6°C	-4.5	-3.1	-2.1	-1.1	-0.1	0.8	1.9	2.7	3.6	4.5	5.4	6°C
8°C	-2.7	-1.6	-0.4	0.7	1.8	2.8	3.8	4.8	5.7	6.5	7.3	8°C
10°C	-1.3	0.0	1.3	2.5	3.7	4.8	5.8	6.8	7.7	8.5	9.3	10°C
12°C	0.4	1.8	3.2	4.5	5.6	6.7	7.8	8.7	9.6	10.5	11.3	12°C
14°C	2.2	3.8	5.1	6.4	7.6	8.7	9.7	10.7	11.6	12.6	13.4	14°C
15°C	3.1	4.7	6.1	7.4	8.5	9.6	10.7	11.7	12.6	13.5	14.4	15°C
16°C	4.1	5.6	7.0	8.3	9.5	10.6	11.7	12.7	13.6	14.6	15.5	16°C
17°C	5.0	6.5	7.9	9.2	10.4	11.5	12.5	13.6	14.5	15.6	16.2	17°C
18°C	5.9	7.4	8.8	10.1	11.3	12.4	13.5	14.6	15.4	16.3	17.3	18°C
19°C	6.8	8.3	9.8	11.1	12.3	13.4	14.5	15.5	16.4	17.4	18.2	19°C
20°C	7.7	9.3	10.7	12.0	13.2	14.4	15.5	16.5	17.4	18.4	19.2	20°C
21°C	8.6	10.2	11.6	12.9	14.2	15.4	16.4	17.4	18.4	19.3	20.2	21°C
22°C	9.5	11.2	12.5	13.9	15.2	16.3	17.4	18.4	19.4	20.3	21.2	22°C
23°C	10.4	12.0	13.5	14.9	16.0	17.3	18.4	19.4	20.4	21.3	22.2	23°C
24°C	11.3	12.9	14.4	15.7	17.1	18.2	19.2	20.3	21.4	22.3	23.2	24°C
25°C	12.2	13.8	15.4	16.7	18.0	19.1	20.2	21.6	22.8	23.3	24.2	25°C
26°C	13.2	14.8	16.3	17.7	18.9	20.1	21.3	22.3	23.3	24.3	25.2	26°C
27°C	14.1	15.7	17.2	18.6	19.8	21.1	22.2	23.3	24.3	25.2	26.1	27°C
28°C	15.0	16.6	18.1	19.4	20.9	22.1	23.2	24.3	25.3	26.2	27.2	28°C
29°C	15.9	17.6	19.0	20.5	21.8	23.0	24.2	25.2	26.2	27.3	28.2	29°C
30°C	16.8	18.4	20.0	21.4	23.7	23.9	25.1	26.1	27.2	28.2	29.1	30°C
32°C	18.6	20.3	21.9	23.3	24.7	25.8	27.1	28.2	29.2	30.2	31.2	32°C
34°C	20.4	22.2	23.8	25.2	26.5	27.85	28.9	30.1	31.2	32.1	33.1	34°C
36°C	22.2	24.1	25.5	27.0	28.4	29.7	30.9	32.0	33.0	34.2	35.1	36°C
38°C	24.0	25.7	27.4	28.9	30.3	31.6	32.8	34.0	35.0	36.1	37.0	38°C
40°C	25.8	27.7	29.2	30.8	32.2	33.5	34.7	35.9	37.0	38.1	39.1	40°C
45°C	30.3	32.2	33.9	35.4	36.9	38.2	39.5	40.7	41.9	43.0	44.0	45°C
50°C	34.8	36.6	38.5	40.1	41.6	43.0	44.3	45.6	46.8	47.9	49.0	50°C

*Comments

The data contained in this information have been obtained in model conditions. When applying the coating under other conditions, it is possible to obtain results slightly different from those given. The Safety Data Sheet is available for the product. Polychem Systems provides assistance in the implementation of the system and its use in the production at the customer.

Each time, the User is obliged to check the suitability of the product and auxiliary means for its use.

The User is obliged to have a current technical card and product safety data sheets, which are provided by the manufacturer at the first sale and each time at the customer's request.

Before the processing, the User is obliged to carefully read the specified documentation and to comply with the rules of handling the product contained therein.