

THE ADVANTAGE OF USING THE RETICULATED POLYETHYLENE PIPES IN THE UNDERGROUND TRANSPORT SYSTEM OF THE THERMAL AGENT

Csaba Istvan MESZAROS¹, Macedon GANEA²

1. eng., drd., University of Oradea, e-mail: mcsaba69@yahoo.com,

2. prof., PhD., eng., University of Oradea

Key words: reticulated polyethylene pipes

Abstract:

The reticulated polyethylene pipes are known as being flexible pipes, which have on their basis the well-known elastically polyethylene, tenacious and shocks resistant.

Because of the multiple advantages and the less disadvantages presented in this paper for the utilization of the reticulated polyethylene pipe, the conclusion referring to this is that their utilization will assure us a better distribution of the thermal agent, easier and faster from the point of view of the technologic installing, more economical and more ecological.

I. INTRODUCTION

The reticulated polyethylene pipes are known as being flexible pipes, which have on their basis the well-known elastically polyethylene, tenacious and shocks resistant.

Scientific researches shown that polyethylene has a very good resistance towards all the chemicals we can find in soil, reaching that in present all the normative and national regulation system to designate polyethylene, as being the most adequate material in realizing the underground network distribution of the thermal agent.

The systems of reticulated polyethylene pipes are well used in the realization of the distribution networks for the thermal agent, ulterior expansion, or deviations of track with the purpose of bypass, for example: other networks (thermal, current or gases), houses, trees, or any other obstacles that can be found on a track. It is important to say that these pipes are used for transporting the thermal agent in the interior of buildings.

This paper wants to mark out the multiple advantages that we can have when using reticulated polyethylene pipes, in comparison with the classical steel pipes, utilized for the long distance transport of the thermal agent.

Here are presented two examples of a thermal network in view of transporting the thermal agent, which have as purpose marking out some relevant elements, in case of using the reticulated polyethylene pipe.

II. ADVANTAGES OF USING THE RETICULATED POLYETHYLENE PIPE

The successful story of the polyethylene pipes started more than 30 years ago, after the discovery of the reticulated polyethylene (PE-X), the polyethylene pipe became competitive even for the transport systems of the thermal agent.

For an easier understanding of the advantages of using the polyethylene further on this paper it is made a comparison between a polyethylene pipe network (figure 2.) and a classical steel network (figure 1.).

We can notice that the polyethylene network is much simple as construction than the steel network. This is due to the flexibility of the polyethylene pipes, so they are manufactured in rolls with lengths between 120m – 1000m and the diameter between DN16 – DN110. In contradiction with the steel pipes that are made in 6 or 12m bars, which need to be combined by welding in order to obtain the wanted network, fact that entails a

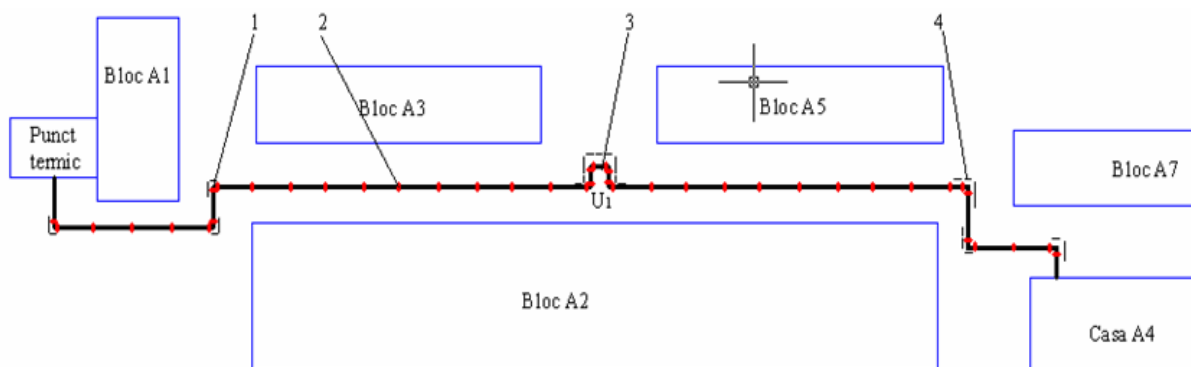


Figure. 1. Classical steel network
 1-elbow, 2-weld, 3-expansion compensator(U1), 4-expansion pad

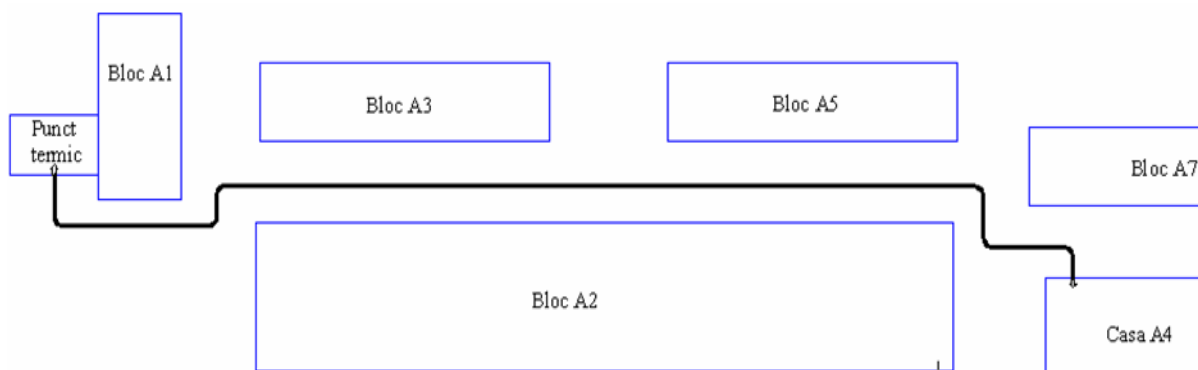


Figure 2. Reticulated polyethylene pipe (PE-X) network

bigger labor force and takes more time. Therewith because of the flexibility of the PE-X pipes, that can assure a minimum curvature raze, in this way realizing the changes of direction needed for the network, without using elbows, unlike the steel ones that use elbows which are also added to the network by welding requiring a special qualified personnel and more installing time.

Another aspect of this type of networks is the lack of bolsters and dilatation constrictors, because the thermal dilatations are taken over the interior of the system. This bolsters and constrictors are used only for the steel pipes for taking over the thermal dilatations that appear in the interior of the network. Using these machines involves a surplus of costs, but not using them would lead to the rapid destruction of the system.

Economies are made even with the roadbed works; the dyke dug for installing will be much narrower in comparison with the one dug for steel pipes, because the polyethylene one is easy and fast to install and the other one needs special positioning for obtaining a good welding.

The advantages of using systems of reticulated polyethylene pipes are:

- flexible and easy to handle when it is in rolls
- proof of the flexibility: until DN110 it is delivered in rolls (figure 3.)
- economy of time, energy and money
- resistance to the action of chemical factors
- it has memory
- cheap tools for installing them

- same life length as the buildings
- nontoxic, non-corrosive, by burning the rests results only water and carbon dioxide
- it is protected of the oxygen diffusion
- makes less noise than the steel ones
- small number of connections
- installation without compensatory
- can be buried in a narrow dyke without using sand
- plain surface, in this way are avoided stone deposits and stuffing
- low costs of exploiting
- a small number of personnel is needed for installing and exploiting



Figure 3. Preinsulated polyethylene pipe in rolls

III. THE DISADVANTAGES OF USING RETICULATED POLYETHYLENE PIPES

An important disadvantage of these systems of flexible pipes is encountered in the case of pipes with a diameter over DN110, because they are made at lengths of 12 meters, resulting in this way a system similar to steel pipes from the point of view of the construction time, installation time, but more expensive. Combining these ones is made with the help of some metallic tapings, and the changing of direction is made with the metallic elbows, pieces that are very expensive.

Another disadvantage is that it can not be used in temperatures more than 100°C, in this way it can not be used to transport the primary thermal agent (that accidentally can reach temperatures of 150°).

Between the disadvantages is considered to be that it can not be equipped with system of signalizing the defections.

IV. CONCLUSIONS

Because of the multiple advantages and the less disadvantages presented in this paper for the utilization of the reticulated polyethylene pipe, the conclusion referring to this is that their utilization will assure us a better distribution of the thermal agent, easier and faster from the point of view of the technologic installing, more economical and more ecological.

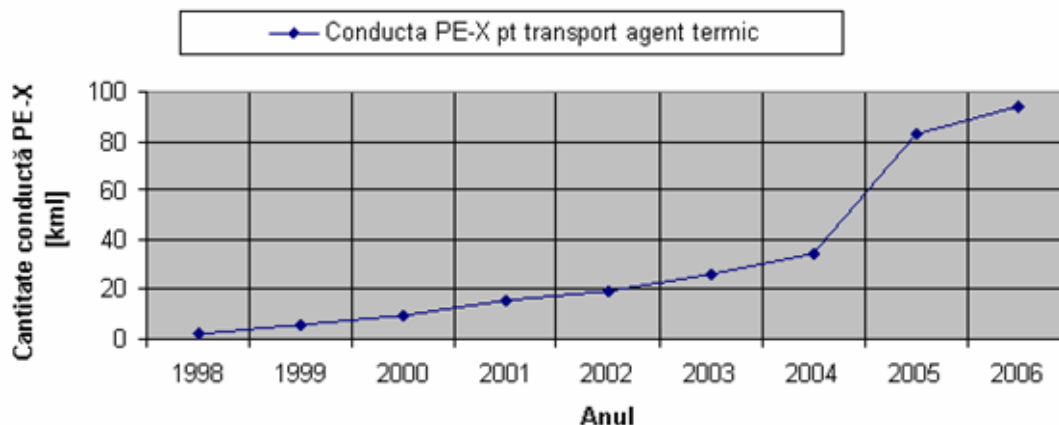


Figure 4. The market demand for polyethylene pipes

The networks based on PE-X have applications in different areas like:

- the transport of drinkable water and the sewage
- thermal heating and distribution systems for cooled water
- the transport of some liquids in the chemical and alimentation industry

Because of the multiple advantages of these pipes their demand on the market grew. In figure 4. is presented the growth of its demand on the Romanian market in last 9 years. These dates were registered by an international firm that manufacture these pipes for the thermal agent and are valid only for pipes with dimensions between DN25 and DN110.

The utilization of the advantages offered by the polyethylene reticulated pipe is possible for the one that knows well the specifically parameters and the characteristics that differentiate the two systems.

BIBLIOGRAPHY

- [1] Catalog ISOPLUS – www.isoplus.ro
- [2] www.uponor.hu
- [3] www.plastsiste.ro
- [4] <http://purmo.rettigicc.com/hu/327.htm>