

## PP-R ENVIRONMENTALLY FRIENDLY MOTIVATION

1. Only 6% of crude oil extracted are being used for the manufacturing of all types of plastic products.
2. Only single layer piping is recyclable to be used either for the manufacturing of lower grade piping/fittings that can be used for irrigation purposes or moulded/extruded for other products. PP-R is one of the very few piping systems used for reticulation of water ect. that qualifies. Multi-layer piping (pipes that consists of different layers) can not be recycled due to the different grades of plastic that do not blend when re-melted. Fittings used in most of these systems, are chrome plated and also not fit for recycling.
3. The fittings used in PP-R systems are manufactured from exactly the same material as the piping and are therefor, as is the case with the piping, fully recyclable.
4. The thermal conductivity (heat loss) of plastics compared to that of copper and steel is massive. Energy saved due to this major difference is of the utmost importance. Heat loss occurs when the heat inside a pipe escapes through the material to the surrounding environment. This can practically be noticed when a hot water tap are turned on. It takes a while for the water to reach the temperature needed, resulting in a substantial waste of water. Some of this is caused by the water cooling down in the pipes and some is caused by energy being wasted in heating up the pipe before releasing hot water through the tap. The important measure here is thermal conductivity, i.e. how easy is it for heat to escape through the pipe material. The thermal conductivity between PP-R, copper and steel are as follows:

Copper – 403 W/m-k  
Steel - 240 W/m-k  
PP-R - 0.24 W/m-k

This means that the heat loss from the PP-R pipe being less than 1/1000th that of copper and less than 1/800th that of steel. The low thermal conductivity of PP-R has the same advantage when compared to black piping (steel) when used for chilled water lines.

5. The production of PP-R has been refined to a very efficient process. For example, the energy required to produce a cubic meter of plastic from raw materials (average of Polyethylene, PolyPropylene and Polybutylene) averages out at 52 000 MJ, compared with 130 000 MJ for steel and 313 000 MJ for copper. To convert this material into the final product also demands less energy with plastic typically being moulded/extruded at less than 300 degrees Celsius compared to copper at 1300 degrees Celsius. This energy demand repeats itself in the recycling process as well.

With energy costs increasing, this comparison is likely to become even more extreme. The negative effect of energy production on the environment should also be taken into consideration.

6. In a recent study conducted by Professor Kaufer at the University of Berlin using the VENOB method (comparitive standardising evaluation), the emissions of plastics, steel and copper piping systems were compared, based on a 16 family housing complex with central hot and cold water distribution at 4 bar pressure as its basis.

## 2.

The study assessed the energy consumption related to air, water and soil emissions at every stage of the production and installation route for the piping systems of various materials. It concluded in every instance that plastic systems had less environmental impact than the metallic alternatives, whilst needing less energy to produce the system in the first place.

Normed indicator for water impact:

Steel system – 4.5

Copper system – 3.5

Plastic system – 3.25(max)

Plastic system – 1.0(min)

Normed indicator for air impact:

Steel system – 18.0

Copper system – 16.0

Plastic system – 4.5(max)

Plastic system – 1.0(min)

Normed indicator for ground impact:

Steel system – 44.0

Copper system – 12.0

Plastic system – 4(max)

Plastic system – 1.5(min)

7. The PP-R pipe system has a life expectancy of more than 50 years on hot water lines and up to 100 years on coldwater lines. Due to the fact that water in South Africa and some other countries are known to be “aggressive” and increasingly becoming so, the life span of metallic alternatives (this includes metallic fittings used on some plastic systems) has shortened drastically. Copper pipes at Grootte Schuur Hospital were now replaced with PP-R pipes after only 5 years from installation. Materials with a short life span is not only costly but increases the pressure on the already overly stressed environment.

### **Conclusion**

As can be seen from the evidence above, there is sufficient evidence to show that PP-R pipe systems are far more environmentally friendly than other alternatives. Combine these environmental advantages with cost, productivity and performance benefits and the case for using PP-R piping systems for hot and cold water applications has never stronger. PP-R is the only pipe system that are endorsed by Green Peace as a “future friendly product”.

