

Environmental Benefits of COOL-FIT™

COOL-FIT is a complete pre-insulated plastic pipe system for secondary cooling and refrigeration piping systems. It is based on the tried and tested ABS system from Georg Fischer which includes pipes, fittings, valves and transition fittings. COOL-FIT offers the option of pre-insulated pipes and fitting either with a black or white PE outer jacket.

Thanks to the new revolutionary jointing technique, using internal nipples (patent applied) it is not necessary to remove the PUR insulation to make a connection. The joint is made using the reliable tried and tested solvent cement technique with TANGIT ABS. Resulting drastically reduced installation times with a top quality system solution.



The pre-insulated COOL-FIT pipes and fittings are delivered ready to install direct to the construction site and use high density PUR as the insulation material. This top quality insulation saves running costs for the end-user thanks to its excellent insulating properties.

An external independent company specialised in life cycle assessments has evaluated the environmental impact of COOL-FIT in two representative refrigeration systems. They have done this with a focus on the secondary piping system and the complete refrigeration plant.

Plastic Piping Systems in Refrigeration Systems

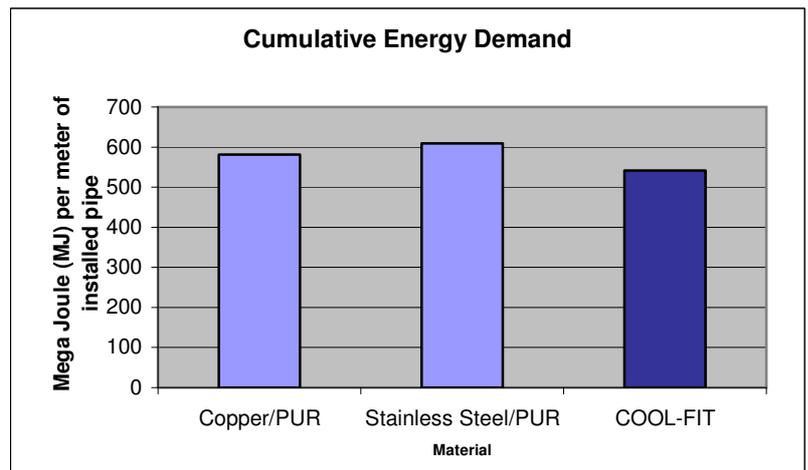
For the piping system and insulation for the secondary system in a refrigeration plant it is possible to use several different types of material. This study compares different materials and types of insulation in the finished installed plant.

	Pipe Material	Insulation Material
COOL-FIT	ABS	PUR
Copper	Copper	PUR
Stainless Steel	Stainless Steel	PUR

It is a cradle to grave analysis taking into account production of the raw material, production of the pipes and components, assembly on-site of piping and insulation, as well as transport.

Energy Consumption

The production, insulation and assembly of COOL-FIT needs less energy compared with the two other options Copper or Chrome Steel. Although plastics are produced from oil, less energy is required for the production of COOL-FIT pipe. The reason for this is that the extraction of metal and the metal processing requires a very high level of energy resources.

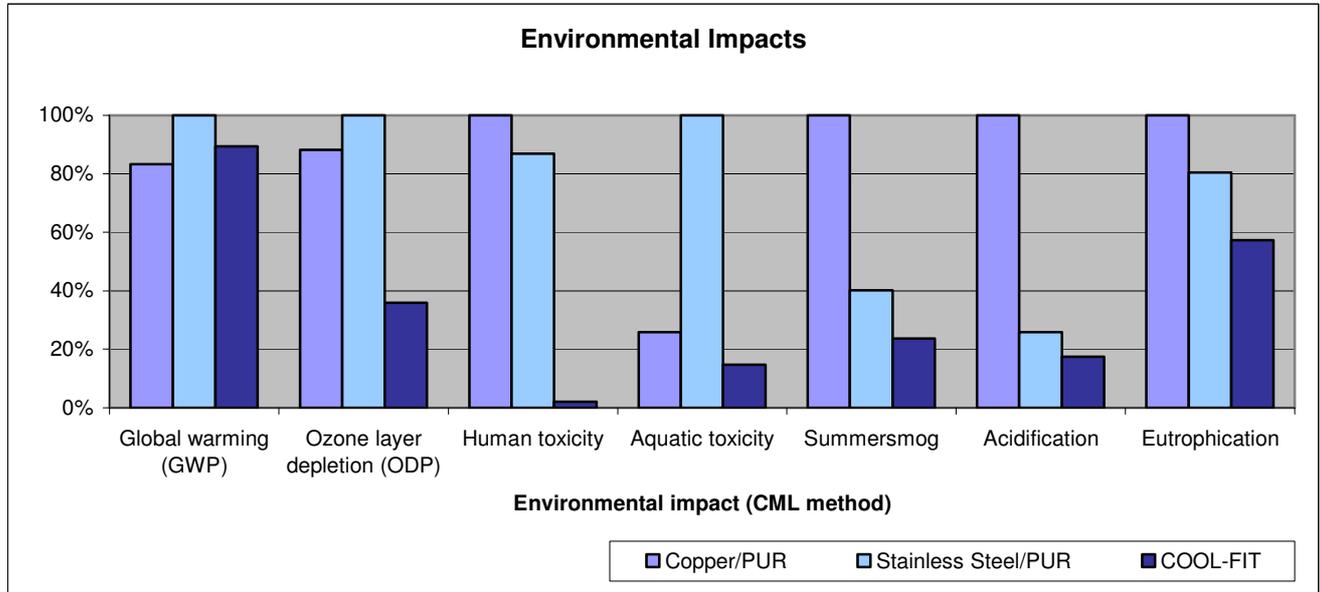


COOL-FIT uses rigid high quality low temperature resistant PUR as the insulation. The rigid insulation allows the pipe to be supported on the outer jacket eliminating the potential for an energy bridge from the carrier pipe. The insulation has a low thermal conductivity of 0.026 W/m.K, a core density of > 45 kg/m³ with a standard – insulation thickness of ca. 35mm. Another energy saving feature of COOL-FIT is the smooth bore of the plastic ABS pipe preventing any corrosion or encrustation and reducing pressure drops to a minimum.

Environmental Impact

Taking into considerations all the environmental aspects evaluated the performance of COOL-FIT is very good. There are less (fewer?, lower?) toxic emissions during the production and processing of the product compared to metal production for example.

Also another advantage of COOL-FIT is its low weight per meter of pipe. The pre-insulated Pipe also requires 30% less pipe supports compared to a standard plastic pipe. The low weight compared with metal means lower costs and less consumption of material for the pipe support structure.



VOC-Emissions

For the jointing of the COOL-FIT pipes we use TANGIT Cleaner and TANGIT Adhesive. During this process there is a release of a small amount of VOC's. In spite of this the emissions COOL-FIT as a whole compare very favourably in terms of the indicators "Human Toxicity" and "Summer Smog". The emissions caused by installation of COOL-FIT are clearly lower as the on-site insulation processes have an extensive use of VOC-containing adhesive or other potentially hazardous materials.

Recycling

All COOL-FIT components can be recycled.

Secondary Cooling Systems

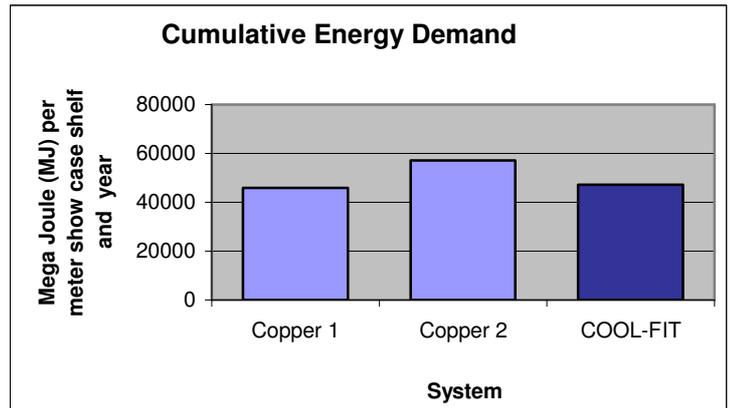
COOL-FIT is only designed for use in secondary cooling systems, for the transport of the cooling fluid. The primary advantage of a secondary cooling system is that the installation requires a lot less refrigerant. Thus losses of refrigerant (= emissions) is drastically reduced, the danger of leakage is reduced and also maintenance costs are cut.

In the mentioned study both direct or indirect cooling systems are compared. Additionally to the above described piping installations, plant operating is also taken into account (mainly electricity- and refrigerant consumption), as well as the disposal and recycling of the piping systems.

	Pipe Material	Insulation Material	System	Refrigerant
COOL-FIT	ABS	PUR	2L / 2L	R134a / R404a
Copper 1	Copper	Armaflex	2L / DX	R134a / R404a
Copper 2	Copper	Armaflex	2L / DX	R404a / R404a

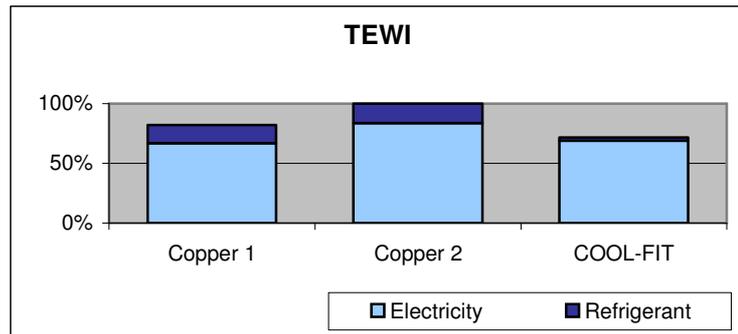
Energy Consumption

Energy consumption of a cooling system is mainly defined by the consumption of electricity during running of the plant. Over 95% of energy consumption is caused by this. Less than 5% is caused through infrastructure, disposal and the refrigerant. COOL-FIT offers excellent insulation and low pressure loss characteristics helping reduce energy consumption to a minimum.



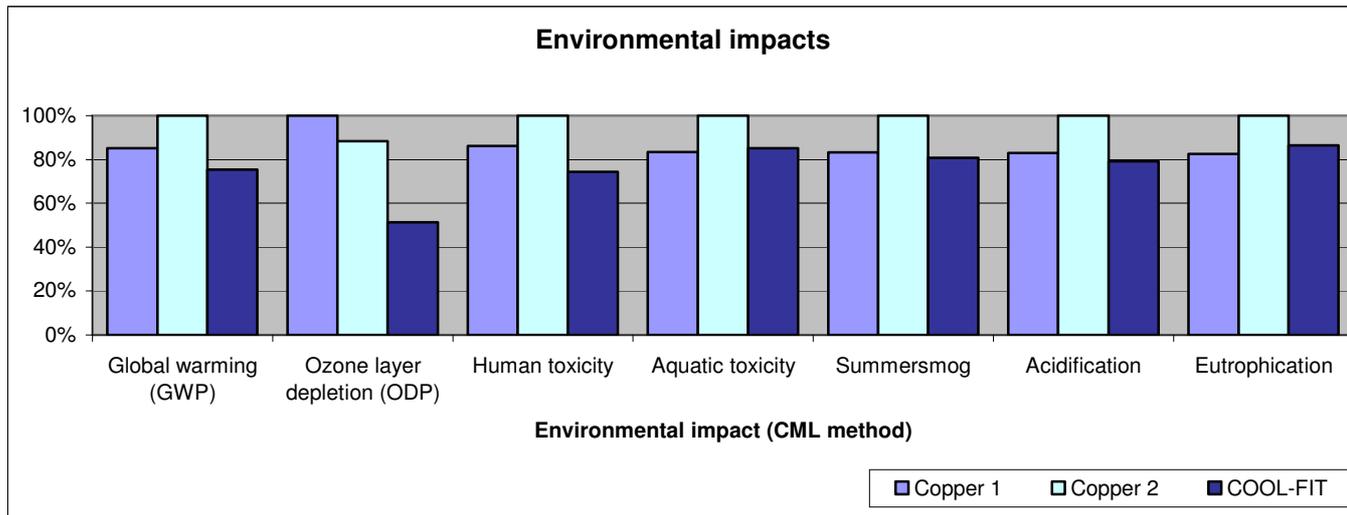
Greenhouse Gas Emissions

Greenhouse Gas emissions are caused through energy consumption and loss of refrigerant to the environment. As a secondary cooling system COOL-FIT clearly shows a far lower release of refrigerants thus COOL-FIT performs best for the very important criteria TEWI (TEWI = "Total Equivalent Warming Impact")



Environmental Impacts

The different environmental impacts are also to a large extent determined by energy consumption, except of the indicator "Ozone Depleting Potential (ODP)". Here loss of refrigerant into the atmosphere is the most important factor. COOL-FIT performs especially well for ODP with the lowest rating of any combination of systems.



Conclusion

Energy consumption during operation has the highest impact on an assessment of a cooling plants environmental impact. With its excellent insulation and low weight COOL-FIT helps to save energy, reducing operating costs, as well as caring for the environment. As well as this the use of environmentally friendly refrigerants and systems that reduce charges and thus reducing losses of refrigerant to a minimum is absolutely necessary for an environmentally friendly cooling or refrigeration plant. The benefits of COOL-FIT in such an overall plant can be seen in this report.



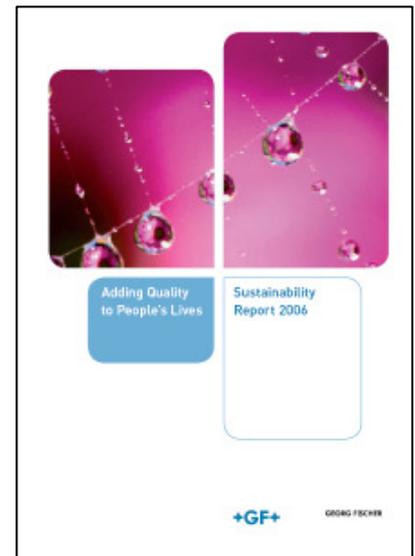
GEORG FISCHER
PIPING SYSTEMS

Georg Fischer and Sustainability

Back in 1992, Georg Fischer signed the ICC (International Chamber of Commerce) Business Charter for Sustainable Development, “officially” committing itself to sustainable business operations. Over ten years ago, we formulated our environmental policy, and every year since 2000, Georg Fischer has published an environmental report.

In 2005, we extended the Corporation’s information system so as to increase transparency over social aspects of the business.

This has allowed us to expand our sustainability reporting and release this publication, thereby completing another milestone in the Corporation’s history. From the very beginning, over 200 years ago, Georg Fischer has provided numerous examples of sustainable practices.



<http://www.georgfischer.com>

All Georg Fischer production sites are ISO 14 001 certificated. This means that an active environmental management system ensures compliance to the international environmental standards and environmental laws.

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This study can be down-loaded in full from the above COOL-FIT homepage or ordered free of charge from Mark Bulmer.