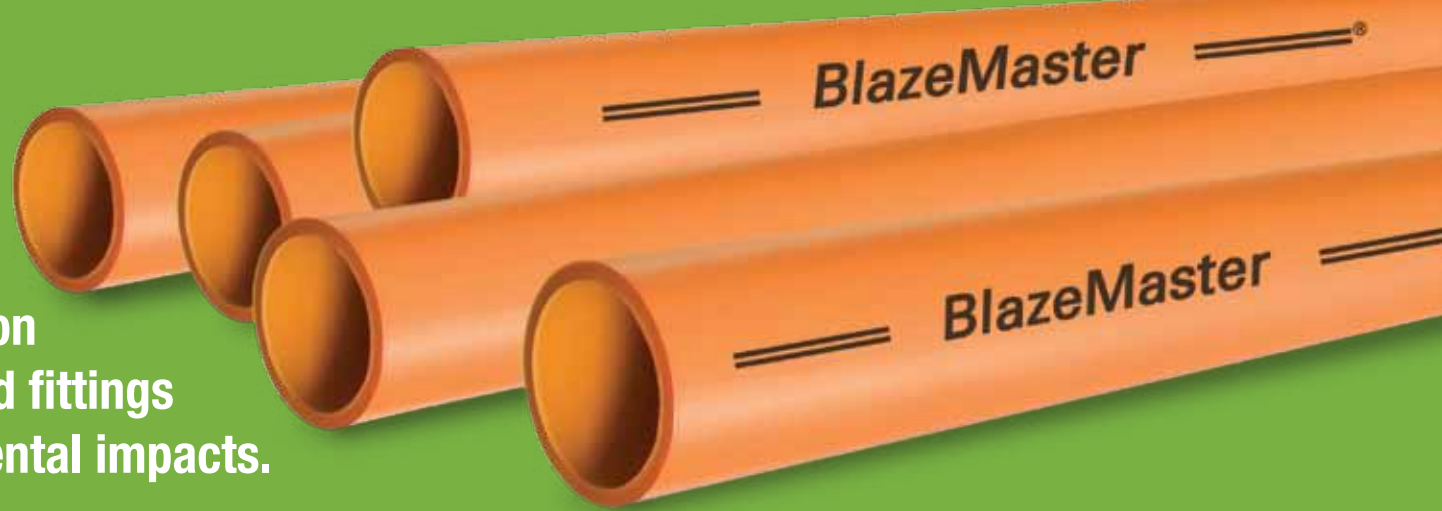


Understanding the environmental life-cycle of a BlazeMaster® Fire Sprinkler System





Lubrizol conducted an LCA on BlazeMaster® CPVC pipe and fittings to understand its environmental impacts.

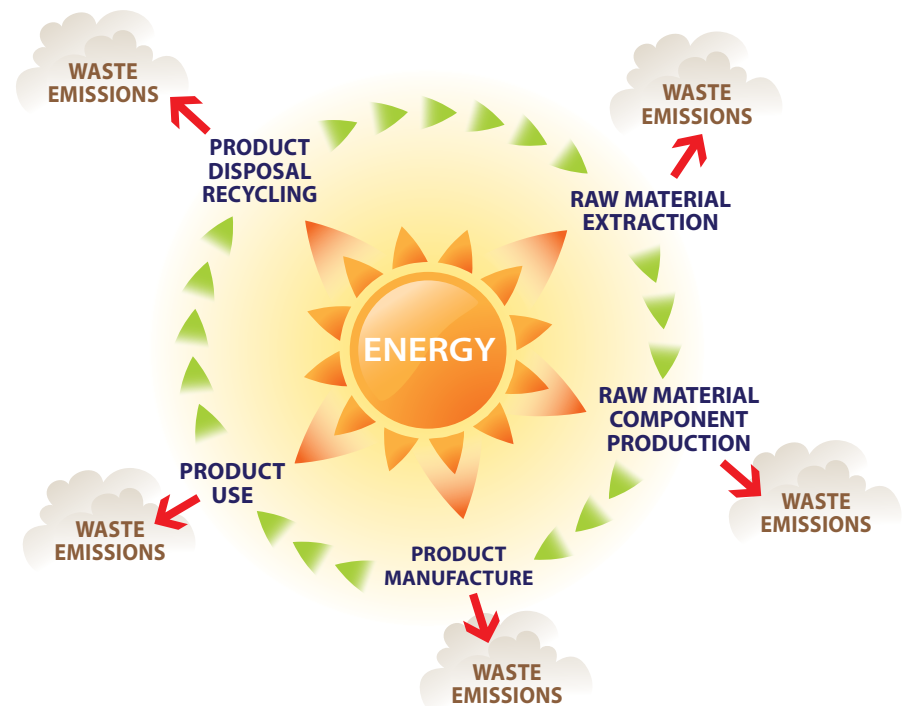
The fire sprinkler market changed dramatically in 1984, when the market's first non-metallic fire sprinkler system was created. Marketed under the BlazeMaster® brand name, the system soon proved to be an alternative to traditional metallic systems.

BlazeMaster® pipe and fittings are designed specifically for fire sprinkler systems. They are made from a specialty thermoplastic known chemically as chlorinated polyvinyl chloride (CPVC). Today, a BlazeMaster Fire Sprinkler System is the most specified non-metallic system in the world approved for both residential and light commercial applications.

Already known for its easy installation and long-term reliability, Lubrizol conducted a life cycle assessment to better understand the environmental impacts of BlazeMaster® pipe and fittings.



Life-Cycle Assessment (LCA)



An LCA assesses the environmental impact of the manufacturing, use and end-of-life phases of a product.

What is an LCA?

To understand the true environmental impact of a product, all material and energy inputs and outputs throughout the life cycle of that product must be accounted for. This is called an environmental life cycle assessment or "LCA".

An LCA assesses and combines the environmental impacts of the manufacturing, use and end-of-life phases of a product, service, process or business activity. In recent years, a community of LCA experts has emerged, and generally accepted principles for the conduct of LCAs have been established. Detailed ISO standards exist for the execution and review of LCAs.

While many currently focus on only carbon, an LCA approach goes beyond global warming and includes a variety of environmental impact categories such as resource depletion, acidification and human toxicity.

Why use an LCA?

When people first became concerned about the environment, the initial focus was on factories—smokestacks and drain pipes. More recently, however, people have come to realize that greater environmental impacts may come from the use and disposal of the products manufactured in those factories.

An LCA helps to identify and quantify the impacts from every phase of a product's life cycle. This is especially important for understanding environmental burden shifting.

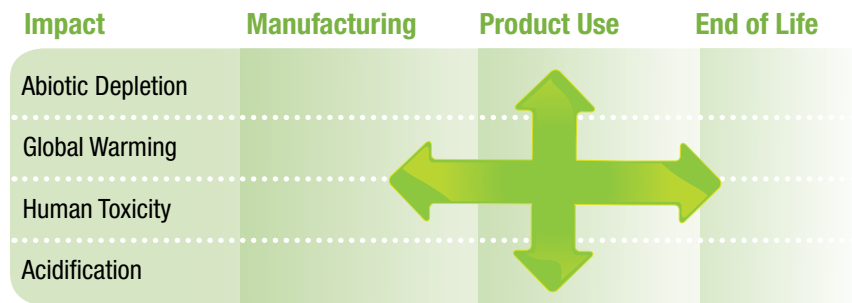


What is environmental burden shifting?

Environmental burden shifting occurs when someone inadvertently:

- 1 increases one environmental impact while attempting to decrease another.
- 2 shifts the environmental impact from one life-cycle stage to another or...
- 3 shifts environmental impacts from one geographic region to another.

Environmental Burden Shifting



Environmental burden shifting is best understood in the context of “greenwash”— where companies tout “green” products that either come from “brown” manufacturing, have “brown” consequences at disposal or push “brown” elements outside the gate to suppliers.

By the same token, an awareness of LCA can enable positive environmental burden shifting. For example it is defensible to increase the global warming impact of manufacturing if it drives a more significant decrease in global warming impact from product use.

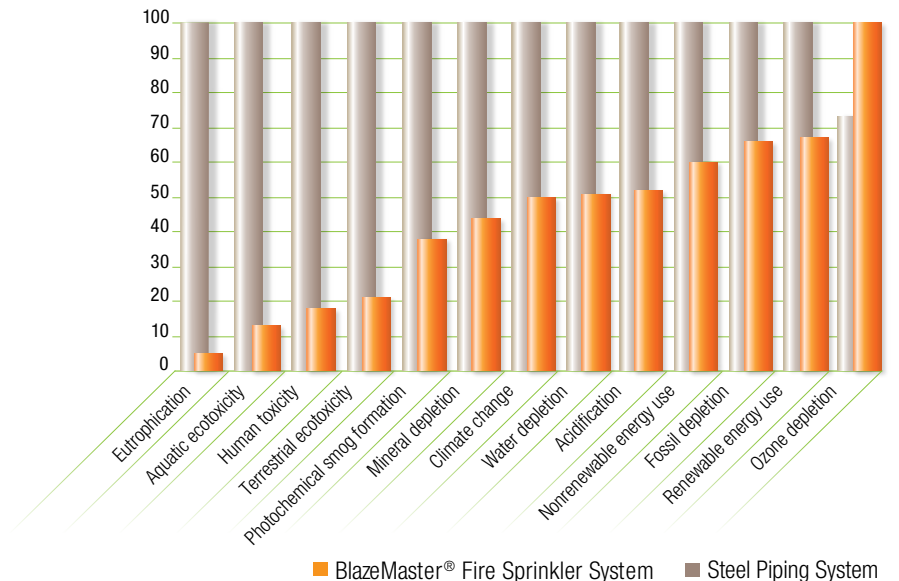
BlazeMaster® CPVC pipe and fittings LCA

Lubrizol has completed an ISO-compliant peer-reviewed LCA of its BlazeMaster CPVC pipe and fittings. The results have been applied to a streamlined LCA comparing CPVC and steel sprinkler systems. Thirteen environmental impact categories were examined across the life cycle of both products.

In 12 out of 13 environmental impact categories, **BlazeMaster CPVC pipe and fittings outperforms steel** (CPVC has a 1/3 higher ozone depletion impact due to the chlorofluorocarbons used in producing the PVC feedstock). Notably, **BlazeMaster CPVC pipe and fittings has half the climate change impact of steel.**

In addition to traditional LCA impact categories, water depletion and energy consumption were evaluated and found to be lower for BlazeMaster CPVC pipe and fittings in comparison to steel.

Environmental Performance Gap



The environmental performance gap between BlazeMaster CPVC pipe and fittings and steel piping systems will likely get wider in the future. Although CPVC is recyclable, the LCA conservatively assumes no CPVC recycling, compared with the 100% recycling rate assumed for steel. As CPVC recycling infrastructure increases, the environmental performance advantage of BlazeMaster CPVC pipe and fittings over steel can be expected to become even larger.

The LCA study is available upon request.



Environmental Impacts Explained



Eutrophication is a measure of nutrient pollution in aquatic ecosystems leading to excess microbial consumption (e.g. algae blooms) that, in turn, results in oxygen depletion.

Why is eutrophication important? Oxygen depletion can result in short or long term damage or even death to organisms living in that ecosystem.



Aquatic ecotoxicity (freshwater) is a measure of the impact that chemicals emitted by human activities have on aquatic ecosystems and the organisms that live in them.

Why is aquatic ecotoxicity important? Toxicity in water can result in short or long term damage or even death of organisms living in that ecosystem.



Human toxicity is a measure of the impact that chemicals emitted to the environment by human activity have on human health.

Why is human toxicity important? Some substances are poisonous to humans and can result in sickness or death through direct contact. Other substances can enter the food chain by accumulating in living organism that we eat (e.g. metals in fish), thereby causing long term health effects.



Terrestrial ecotoxicity is a measure of the persistence, accumulation and toxic effect of chemicals in soil ecosystems.

Why is terrestrial ecotoxicity important? The gradual increase in the level of persistent toxic substances can adversely impact living organisms throughout the food chain.



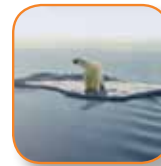
Photochemical smog formation is a measure of the impact from photo-oxidant formation. Smog is formed by the reaction of sunlight with certain air pollutants, such as volatile organic compounds (VOCs), nitrogen oxides (NOx) and carbon monoxide (CO).

Why is photochemical smog formation important? Smog is often seen as a brown haze that adversely impacts human health and damages plants. It is especially harmful for senior citizens, children and people with heart and lung conditions such as emphysema, bronchitis and asthma.



Mineral depletion is a measure of the impact from extracting and consuming non-renewable natural resources such as iron ore and coal.

Why is mineral depletion important? The consumption of resources that cannot be regenerated, or may take millions of years to do so, limits the options of future generations and can result in more expensive and damaging exploration and extraction of poorer or less available reserves.



Climate change is a measure of the impact from man-made emissions that can cause heat to be trapped in the earth's atmosphere, causing the Earth's surface temperature to rise. These emissions include carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), among others.

Why is climate change important? The consequences of global warming may include increased temperatures and regional climate changes. Human health, agriculture and wildlife can be adversely affected.



Acidification is a measure of the impact from acids, which are emitted to the atmosphere and deposited in water and soil. The acids arise from air pollutants, such as sulphur dioxide (SO_x) and nitrogen oxides (NO_x).

Why is acidification important? Acidification leads to a decrease in natural pH (increase in acidity), which can have detrimental effects on forests and fish mortality. Acidification can also damage surface coatings and mineral building materials.



Nonrenewable energy is not a traditional LCA environmental impact category per se but rather is a recognized indicator of common interest.

Fossil depletion is a measure of the impact from extracting and consuming non-renewable natural resources such as fossil fuel.

Why is fossil depletion important? The consumption of resources that cannot be regenerated, or may take millions of years to do so, limits the options of future generations and can result in more expensive and damaging exploration and extraction of poorer or less available reserves.



Renewable energy is not a traditional LCA environmental impact category per se but rather is a recognized indicator of common interest.

Ozone depletion is a measure of the destruction of ozone in the stratosphere which absorbs solar ultraviolet radiation.

Why is ozone depletion important? Increased UV radiation can increase human health risks (skin cancer) and adversely impact plant life and aquatic ecosystems.

Note: For some impact categories, particularly human, aquatic and terrestrial ecotoxicity, the impact assessment reflects potential, not actual, impacts and takes no account of the local receiving environment.

The LCA study is available upon request.

Make the right call.

These LCA findings, when combined with all the other benefits of a BlazeMaster® piping system, including corrosion resistance, a fast, easy and safe installation process and lower costs, are the reasons why BlazeMaster® Fire Sprinkler Systems are the most specified non-metallic systems in the world.



BlazeMaster® FIRE SPRINKLER SYSTEMS

For more information, please visit www.blazemaster.com
or email us at blazemaster@blazemaster.com

Lubrizol

9911 Brecksville Road
Cleveland, Ohio 44141-3201 USA

888.234.2436 ext.4477393
216.447.6311 FAX

FBC

Building Solutions

FlowGuard Gold® Plumbing Systems
FlowGuard® MultiPort Manifold
FlowGuard® MultiPort Commercial System
FlowGuard® Bendable Piping
BlazeMaster® Fire Sprinkler Systems
BlazeMaster® Multipurpose Systems
Corzan® Piping Systems
Corzan™ Industrial Systems

® is a registered trademark of The Lubrizol Corporation.
™ is a trademark of The Lubrizol Corporation.

© The Lubrizol Corporation 2010, all rights reserved.
11-10
FS-ENWMTL