

Patent Pending

ozone bleach

Earth - Friendly

Global Warming

World's First

CO₂ Reduction

Ecological

Kyoto Protocol

OZONE BLEACH

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Planet Earth's environment is the most critical issue for humankind in this century.

The course of human societies and their industrial development has caused severe destruction of the global environment, as mass consumption of fossil fuels steadily increases greenhouse CO₂ gases and propels dire forecasts of global warming.

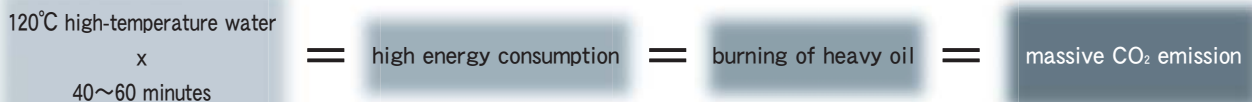
The Kyoto-Protocol (2005) requires Japan to reduce CO₂ emission by 6% relative to 1990 levels by the year 2010. It is not an easy target to achieve, yet we must succeed in this challenge for the future of Planet Earth. As a textile industry manufacturer, so as to become a strong part of the force to reduce CO₂, we have developed the world's ultimate ecologically-responsible bleaching technology, "Ozone Bleach".

Issues stemming from current scouring and bleaching processes :

In the manufacture of textile products, the dyeing process requires the most energy consumption. Dissecting the process still further, the bleaching portion wastes the most energy.

All kinds of textiles, whether at the yarn or fabric stage of processing, must undergo the scouring and bleaching processes before piece bleaching or dyeing. It is said that bleaching is the most fundamental process of all textile manufacturing.

Modern bleaching processes require high-temperature water at roughly 120°C over a duration of 40-60 minutes, and utilize a large volume of chemicals. For the past 50 years, this technique has not evolved: it can hardly be called "environmentally friendly".

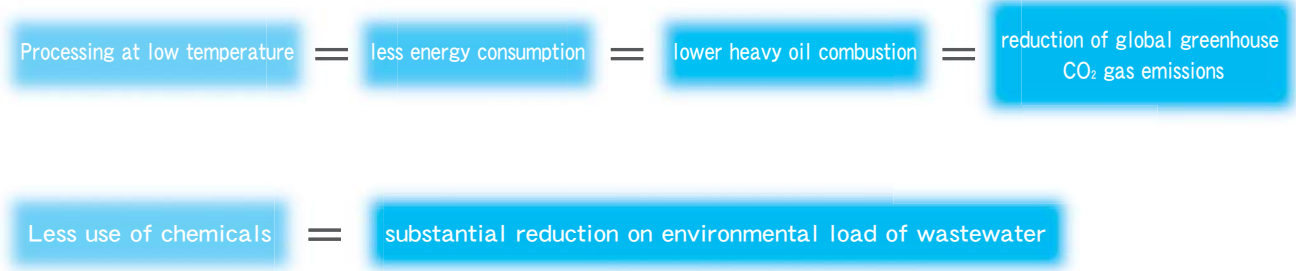


What is Ozone Bleach ?

Industrial production of ozone can be accomplished by applying a plasma discharge to oxygen in air. Despite the fact that Ozone (O₃) is a natural substance, its oxidizing bleaching power is strong, and it decomposes rapidly.

This technology is the first of its kind in the world to make fabrics react with ozone at low temperature, and furthermore uses almost no chemicals for the scouring and bleaching process.

* Ozone (O₃) naturally decomposes. turning into $O_3 \rightarrow O_2 + O^+$.
At this stage, the oxidizing bleaching property becomes active.



How positive is this for the environment ?

Let's find out to what extent CO₂ can be reduced relative to the conventional scouring and bleaching process. (Note that the amount of energy required for ozone bleaching is limited to the amount of energy necessary for ozone's decomposition.)

Setup: cotton yarn: 1kg, water: 10 liters.

With a conventional scouring and bleaching technique

To process 1kg cotton yarn, approximately 1300kcal of energy is necessary.
Volume of CO₂ emissions: ~ 480g

With the Ozone Bleach technique

To process 1kg cotton yarn, approximately 200kcal of energy is necessary .
Volume of CO₂ emission: ~ 70g

Ozone Bleach enables a reduction of CO₂ emissions by roughly 410g per 1kg cotton yarn, equivalent to roughly 85% reduction from the CO₂ emissions of the traditional scouring and bleaching technique.

Factoring the product weight into the formula above yields a figure for the magnitude of reduced CO₂ emission per product, which manufacturers can disclose for promotion purposes.

What is Ozone ?

O_3 is the chemical symbol for ozone, which consists of three oxygen atoms, and in fact exists all around us in the earth's atmosphere: **0.005ppm** of ozone is always present in air, working continuously to **clean the air**. In woodlands, there exists roughly 0.005-0.01ppm of ozone which preserves the environmental balance of plant matter. The Ozone layer that covers the globe also protects us against harmful ultraviolet rays.

Ozone decomposes naturally to $O_3 \rightarrow O_2 + O^+$ at a rapid rate, and this decomposition is the stage at which its **oxidizing and sterilizing power is effective**.

Ozone bleaching techniques can be applied to other fields such as:

- ① sterilization of water supply
- ② sterilization of mineral water
- ③ sanitation at food manufacture plants
- ④ purification of hand-washing water in hospitals
- ⑤ sterilization of swimming pools
- ⑥ oxidization rinsing for semiconductors
- ⑦ purification of sewage

How is ozone produced ?

Ozone is produced by putting the 19% of oxygen present in air through **Pressure Swing Adsorption (PSA)** and raising its **concentration to 90%** level, then **plasma discharge** is used to generate ozone.

Is ozone safe or hazardous ?

High concentrations of ozone yield adverse effects on the human body, yet low levels of ozone -- **less than 0.01ppm** -- are considered harmless. In addition, ozone decomposes rapidly in nature and leaves no harmful residue .

Our Ozone Bleach technique produces high levels of ozone concentration during the manufacturing process, however as processing ends the ozone rapidly decomposes, therefore the manufactured products themselves are **perfectly safe for use**.

Ozone Bleach trademark

With sound **ecological practice** at its base, the Ozone Bleach trademark represents earth-friendly technology: **a green planet earth enveloped by clean** water which **circulate in the ecological system**.

This trademark also will be used for stickers and labels affixed to products to promote consumer awareness.



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Ozone Bleach Association, Limited Liability Partnership

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