Cosmo Oil Group environmental technology and products

**Automotive oil products (Cosmo Oil Lubricants Co.)**

- **Oil for gasoline engines “Cosmo LIO SL(*1) series”**
  - These oils keep the engine clean, increase heat resistance, and reduce fuel consumption. They also help reduce engine oil consumption.

- **Oil for diesel engines “Shinsei”**
  - Chlortane content is one-tenth that of conventional oils. Extends engine life and mileage between oil changes.

- **Eco Diesel “Kaisei”**
  - For use in engines with DPF(*2), this diesel engine oil increases heat resistance and reduces wear.

- **Oil for natural gas engines “Cosmo CNG Oil”**
  - Special oil for natural gas and LP gas engines, with increased heat resistance, high-temperature detergency and lower wear. Extends engine life and mileage between oil changes.

**Oil products for other uses (Cosmo Oil Lubricants Co.)**

- **Biodegradable lubricants “Cosmo Terra series”**
  - This lubricating oil, which can be decomposed by microorganisms into carbon dioxide and water, has been certified as an Eco Mark (UEA-Japan Environment Association) product. Having a wide range of applications, including port industry equipment, construction and agricultural equipment, railway cars, outboard motors, chainsaws, and others.

- **Hydraulic oil “Cosmo Super Epoch UF46”**
  - This non-zinc group, high flash point, low wear hydraulic oil conserves electric power and reduces waste material generation (extended life).

- **Metal cutting oil “Cosmo Clean Cut Cool series”**
  - For use in engines with DPF(*2), this diesel engine oil increases heat resistance and reduces wear.

- **Lubricating oil for food and drug processing machinery “Cosmo Underoll Series”**
  - This lubricating oil meets the requirement of USDA/NSF III. Has been used extensively at HACCP-certified food and medical product factories around the U.S., Europe and Japan.

**Coating agents (Cosmo Trade & Service Co.)**

- **Heat insulation coatings “Super Therm”**
  - A heat-insulating coating material first developed by NASA. We are developing a broad range of applications including insulation for railway cars, buses and trucks in addition to roofing and piping.

- **Concrete protector and strengthening “Ashford Formula”**
  - This product extends the life of concrete floors and suppresses concrete dust. Has applications at distribution centers, home improvement centers, and factories. Imported from the U.S.

**Plant facilities**

- **Hydrocarbon vapor recovery unit (Cosmo Engineering Co.)**
  - A unit for recovering hydrocarbon vapors from gasoline, etc., using our unique “Cosmo adsorption method.” New use of petroleum facilities not only of Cosmo Oil Group but also of other companies.

- **Volatile organic compound (VOC) recovery unit (Cosmo Engineering Co.)**
  - Recovery unit using the same technology as vapor recovery unit. Praised for its high recovery rate, space-saving size, and high level of safety, it is widely used in chemical, printing, and pharmaceutical industries.

- **Chemical-free boiler water production unit* (Cosmo Engineering Co.)**
  - Eliminates chemicals added to boiler supply water and cuts volume of blow down water. This enables a matching reduction in fuel use, and contributes to prevention of global warming.

- **Excess sludge reduction unit (Cosmo Engineering)***
  - When installed in addition to the existing activated sludge unit, this unit reduces generation of excess sludge. By reducing excess sludge, which formerly was processed as industrial waste, by 90%, this contributes to the reduction of the volume of garbage.

**Wastewater treatment technology (Cosmo Engineering Co.)**

- **Dioxin removal unit for wastewater (Cosmo Engineering Co.)***
  - Uses our own independently developed activated carbon for the treatment of wastewater contaminated with dioxins. Helps remove dioxins in wastewater from final treatment facilities and in the discharge from the dismantling of incinerators.

- **Wastewater treatment system “Bioflora 01” (Cosmo Eco Support)**
  - Using microorganisms, this product decomposes oil and organic materials in wastewater into water and carbon dioxide. No chemicals or filtration films are necessary.

- **Benzene utilization (Cosmo Matsuyama Oil Co.)***
  - Takes benzene generated from the benzene separation process at oil refineries and uses it as an ingredient for upgrading chemical products by processing it with equipment such as aromatics extractors.

**Natural gas fuels (Cosmo Oil Gas)**

- **Liquefied Petroleum Gas**
  - Cosmo Oil Gas supplies LP gas, a clean energy that has low environmental impacts similar to natural gas. Also is working to boost demand for LPG by promoting advanced LPG-powered cars, basic LPG fueling stations, and LPG cogeneration for houses. We will work on other clean energy projects such as LNG and DME, promoting a stable supply of gas energies in harmony with the environment.

- **ECOWILL home-use LP gas engine cogeneration system**
  - ECOWILL is generated using clean LP gas and the heat produced upon generation is used for water and room heating. Primary energy consumption is cut by 50%, and there is also a cut by some 30% of CO2, which is a cause of climate change. With an energy use rate of 85%, twice the energy efficiency of current electrical supply systems is achieved. In 2004 monitored sales were commenced in LP gas exclusive distributors, using as the showpiece the product’s contribution to environmental conservation.

**Others (Cosmo Matsuyama Oil Co.)**

- **Base material for neutrino detector, “Pseudocumene”**
  - This product is used as a base material in a new method of neutrino detection at KamLAND, a neutrino detection facility for a research project organized by Tohoku University.
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### Automotive oil products (Cosmo Oil Lubricants Co.)
- **Oils for gasoline engines “Cosmo LIO SL”**
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- **Hydraulic oil “Cosmo Super Epoch UF46”**
  - This non-zinc group, high flash point, low wear hydraulic oil conserves electric power and reduces waste material generation (extended life).
- **Metal cutting oil “Cosmo Clean Cut Cool series”**
  - This metal cutting oil is chlorine-free. Helps solve problems associated with chlorine in waste oil disposal and cleaning processes.
- **Lubricating oil for food and drug processing machinery “Cosmo Underoll Series”**
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- **Wastewater treatment technology (Cosmo Engineering Co.)***
  - A technology that combines a high-efficiency activated sludge unit, denitrification, and phosphorus removal units. It is being used for advanced treatment of effluent from not only oil refineries, but also pig farms and other facilities.
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### Plant facilities
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- **Chemical-free boiler water production unit***
- **Hydrocarbon vapor recovery unit***
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