

What Is Diluent?

Diluent is a thinning agent made up of a mixture of organic compounds containing the lighter hydrocarbons. Hydrogen and carbon make up the basis of almost all petroleum products refined from crude oil such as gasoline, jet fuel, asphalt and the petrochemicals that go into many consumer products.

Diluent components are naturally found in oil. The lighter hydrocarbons of petroleum have been used for many years to dilute the thick crude oil. Similar products in natural gas are also referred to as “condensate.”

Large amounts of diluent are needed to dilute the heavy crude petroleum that is produced in the Canadian oil sands because it is often too thick to be pumped easily by pipeline.

Which Hydrocarbons Are In Diluent?

Hydrocarbons make up a number of familiar substances that are separated in the refining process and are contained in many of the products we use every day, including the asphalt we drive on, the fuel in our car and the petrochemical-based plastics we all use every day.

Like most petroleum, diluent is flammable and contains volatile substances in varying percentages. The lighter hydrocarbons included in diluent are typically naphtha, benzene and pentane. These types of hydrocarbons are also included in the gasoline we use in our vehicles. For instance, benzene accounts for about one percent of gasoline content. Naphtha is contained in shoe polish and Coleman fuel or white gas. These types of lighter hydrocarbons are included in the gasoline that is commonly transported by pipelines, trucks and railroad cars that operate in communities across North America.

How Is Diluent Made?

The light hydrocarbons that collectively are referred to as diluent are condensed from natural gas wells (hence the name “condensate,”) or separated from other hydrocarbons at refineries that process crude oil into gasoline, jet fuel, diesel fuel and other petroleum products. Some of the hydrocarbons typically used as diluent are produced in Alberta – but not enough to meet the needs of growing production from the oil sands. With Canadian oil production expected to nearly double by 2020, increased supplies of diluent are needed to transport the thick Canadian crude to refineries, which produce the motor fuels and other products we depend on to power our personal vehicles and satisfy other important energy and manufacturing needs.

Refineries can generate diluent as a natural part of separating the crude oil hydrocarbons into various transportation fuels and ingredients used to produce a wide variety of consumer products. Natural gas plants separate the liquid portion of the gas stream to provide the dry gas used to heat our homes and fire our boilers. These lighter hydrocarbons, lower in octane, are typically blended into motor fuel or used in various petrochemical manufacturing processes.

Is Diluent Hazardous?

During normal operations there are no hazards to those who live and work along the pipeline. As with gasoline and other petroleum products, diluent should be properly handled and contained.

Enbridge maintains an aggressive pipeline integrity maintenance program and a pipeline public awareness effort to help promote the environmentally responsible and safe operation of all its pipelines. Highly trained Enbridge professionals monitor the operation of our pipelines 24 hours a day, seven days a week. We conduct regular inspections of equipment and patrol our pipeline routes no less than 26 times a year. Additionally, we communicate annually – or more often – with those who live and work near our pipelines and with local public officials regarding how we operate our facilities, while providing them with information about pipeline safety.

Enbridge works closely with local fire departments to help educate them on how to safely and appropriately respond to a pipeline incident in the unlikely event of a leak. We also include messages in our public awareness communications to nearby residents about how to identify, report and safely avoid areas where petroleum may have leaked or spilled.

Flammability: Diluent, like all hydrocarbons (crude oil, natural gas liquids) that are transported is flammable. And like these other hydrocarbons, diluent requires two conditions in order to ignite: the presence of an ignition source and being released in a narrowly-defined concentration (one to seven percent diluent) with the surrounding air. Contained within a closed pipeline system, the petroleum hydrocarbons are mixed with little or no air and thus have no opportunity for ignition. Equipment installed on the Enbridge system, such as electrical equipment and motors within secured pumping stations, is designed to avoid introducing ignition sources.

Health: If released to the atmosphere, all hydrocarbons that are commonly transported in petroleum pipelines present some degree of breathing hazard depending on the product and exposure. No hazardous levels of vapors will be released from the closed pipeline system or within facilities during normal operations. In the unlikely event of a leak, those working or living nearby should move away from and upwind of the leak site in order to prevent prolonged exposure to vapors. Enbridge workers and emergency personnel have the equipment and training to check levels of hydrocarbons in the air and use appropriate personal protective equipment.

Environment: The pipeline is a closed system and is designed to minimize emissions. In the unlikely event of a leak, Enbridge is prepared to respond and quickly remove spilled product. Aggressive measures are taken to remove impacted soils and, if necessary, monitor groundwater to make sure no risks are posed to nearby drinking water sources. Community drinking water sources, such as aquifers, are typically sourced from deep underground, and geological layers protect them from immediate exposure. Environmental agencies oversee response, including cleanup and steps taken to avoid potential threats to the environment or drinking water.

Diluent plays an integral role in facilitating the transportation of the heavy crude oil, which is refined to provide the fuel that we use every day. Refined petroleum products, such as petrochemicals, also serve as feedstock for the production of critical materials such as plastics, synthetic fibers and other industrial chemicals that help improve our quality of life.