

ETHANE

What is ethane?

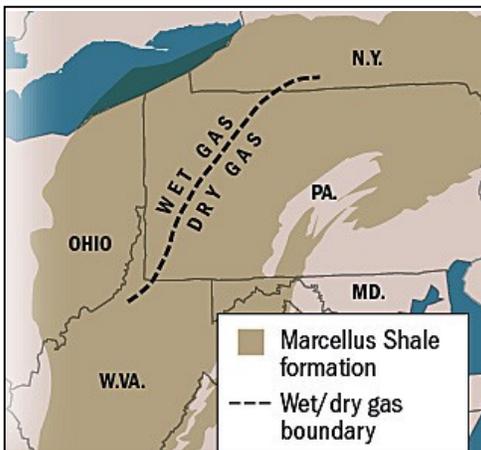
Ethane (C₂H₆) is a colorless, odorless combustible gas that is part of the mixture known as natural gas. It is a naturally-occurring hydrocarbon that can be found underground in liquid form in rock formations, such as shale and coal beds, including the Marcellus and Utica shale formations. Ethane is commonly referred to as a natural gas liquid.

What are natural gas liquids?

Natural gas is a combination of a variety of different gaseous hydrocarbons, the most common of which is methane. Methane, which may typically account for between 85 percent to 99 percent of the natural gas produced from a natural gas well, is most often associated with uses such as heating, cooking and electric power generation, among other uses. For more information, please consult the MSC's fact sheet on [methane](#).

Natural gas liquids, or NGLs, is a reference to the portion of the natural gas stream that is not methane. NGLs are extracted from the earth in a gaseous form, processed and are typically transported and stored in liquid form.

In addition to ethane, which is the most plentiful NGL, other NGLs include propane, butane, isobutane and natural gasoline (pentanes and heavier).



Where is ethane produced in Pennsylvania?

The presence of ethane and other NGLs is determined by the thermal maturity of the hydrocarbon-bearing formation. The thermal maturity of the hydrocarbon depends upon how much pressure and temperature has been exerted on the geologic formation, and for how long.

In the Marcellus Shale formation in Pennsylvania, NGLs occur in the western part of the state, which is often referred to as the 'wet gas' area. Natural gas produced in northcentral and northeastern Pennsylvania is almost exclusively methane and is often referred to as 'dry gas.'

How is ethane transported?

Ethane converts to a gaseous form under standard pressure and temperature as it is extracted, but once separated from the natural gas stream at a cryogenic plant, ethane is stored under pressure and temperature in a liquid form. It is most commonly transported by underground pipeline while in liquid form to a processing facility, such as an ethane cracker.

Pipelines are regarded as the safest means of transportation. According to the Association of Oil Pipe Lines (AOPL) and the American Petroleum Institute (API), there more than 200,000 miles of liquid pipelines across the United States. According to an analysis of publicly available data by AOPL and API, liquid pipelines have a safety delivery rate of 99.999 percent. The majority of pipeline incidents are extremely limited events with minimal to no environmental impact.

Pipelines are subject to robust construction, operating and environmental performance standards. For more information, please consult the MSC's fact sheets on [Pipeline Oversight](#) and [Pipeline and Midstream Facilities](#).

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What should you do in case of a leak from an NGL pipeline?

Should an NGL leak occur or be suspected, the most important steps to take are to immediately evacuate the area and notify the appropriate authorities. It is important to ensure that no ignition sources are introduced or used in the area until authorities have determined that the area is safe. Examples of ignition sources to avoid include cigarettes, emergency flares, running engines and electronic devices. While the potential to ignite a leak from a distance is rare, it is always imperative to act with an abundance of caution so as to minimize the potential risk for personal injury or property damage.

Liquid ethane is less dense than water, so it has a tendency to bubble to the surface and dissipate into the air should it ever come into contact with a water source.

How do operators ensure ethane is shipped safely through pipelines?

Pipelines that transport ethane and other NGLs are constructed to high industry and government-mandated standards. Steel used in the pipeline is thoroughly tested and treated with protective coatings to guard against damage and corrosion, and visual and X-ray inspections of welds connecting pipeline segments are conducted. Additionally, pipelines are tested prior to being placed into service with water (hydrostatic testing) at pressures that exceed its normal operating conditions. Operators monitor the pipeline at all times while in service, and can utilize emergency shut-off valves to interrupt service should a potential safety issue be identified.

Ethane pipeline operators are overseen by the Pipeline and Hazardous Materials Safety Administration. Pipelines are inspected to ensure that they are operated in accordance with federal standards, including a review of all operation and maintenance procedures, abnormal and emergency operating procedures, damage prevention and public education programs, integrity management and pipeline inspection, repair and operations.



What is ethane used for?

Ethane is a chemical feedstock that is 'cracked' – or broken down – at an ethane cracker plant to produce smaller, more useful hydrocarbon molecules, such as ethylene. Ethylene is then converted to polyethylene, a fundamental manufacturing component of both the plastics and petrochemical industries.

Polyethylene is used to manufacture tens of thousands of products commonly used in everyday living – such as plastic bags, buckets and water bottles – along with electronics, advanced medical devices and other high-tech commodities that improve our lives.

Ethane also can be used as a refrigerant in cryogenic refrigeration systems.