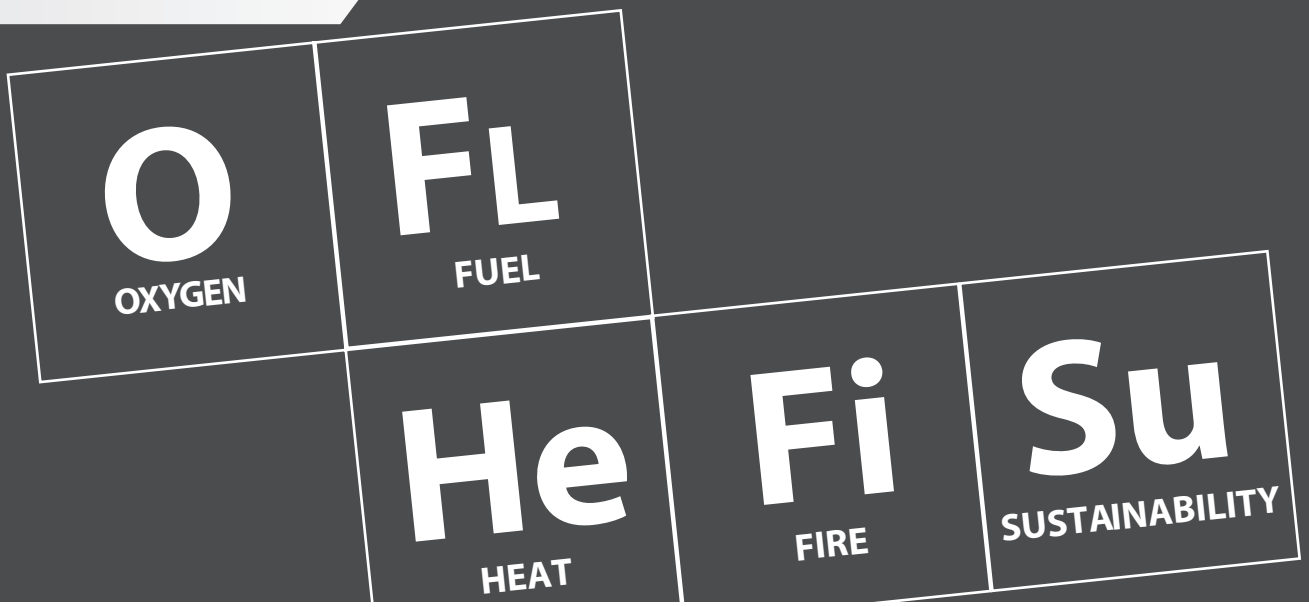
KURZ INSTRUMENTS INC.

COMPONENTS NEEDED FOR IGNITION TO OCCUR



OXYGEN

Availability of Oxygen

Biogas collection systems typically are designed to exclude free oxygen.

There is insufficient oxygen available for combustion to occur.

FUEL

Concentration of Flammable Material

In the case of biogas mixtures – When there is less than 5% methane in the gas mixture, the gas is too lean to burn. When there is more than 15% methane in the gas mixture, the gas is too rich to burn.

Most biogas applications run between 40 and 70 percent methane.

There is too much methane in the process for combustion to occur.

HEAT

Heat to Initiate Reaction

Methane gas must reach 530ºC before auto-ignition can occur.

In operation, the 454FTB-WGF has an overheat temperature of 300ºC.

Combined with a maximum allowable process temperature of 120ºC for a total maximum sensor temperature of 420ºC or 26% below the minimum auto-ignition temperature of methane.

The 454FTB-WGF cannot initiate sufficient heat for combustion under any biogas mixture.

SUSTAINABILITY

Available Energy to Sustain Combustion

The fourth component required to cause an explosion is the ability to sustain the auto-ignition. There must be a large enough energy source to sustain combustion.

The three primary components must continue to sustain a chain reaction to create an explosion. Removing one of the primary components eliminates the possibility of fire.

The lack of oxygen, a fuel source that is too rich, a heated device that is way below the auto-ignition temperature of methane, and an effective heated surface area too small for sustained combustion results in a safe flow measurement.

FLAME-PROOF & EXPLOSION-PROOF

Every facility operator has to understand the level of safety required for their processes. Kurz Instruments uses several testing laboratories to adhere to CSA, ATEX, and IECEx requirements for U.S., Canadian, and European compliance. Using third-party verification ensures Kurz devices meet explosion-proof and flame-proof safety requirements for a variety of environments that include combustible materials.

If given the right conditions, many types of dust and vapor have combustible properties, including:

- Grain in a grain elevator
- Sugar, flour, egg whites, powered milk, and rice in food production
- Rubber, plastics, and pharmaceuticals in chemical manufacturing
- Metal processing and recycling
- Biogas
- Coal-fired power plants

Because potentially flammable process conditions exist throughout industries, instrumentation must be designed so that ignition within these environments can never occur. Additionally, any instrument must be certified by a national laboratory to verify that it is safe to use in a potentially flammable environment.

The Kurz 454FTB-WGF has been CSA tested and certified to meet the requirements for the explosion-proof and flame-proof standard levels for use in Ex d IIB + H2 Gb, T4, or T3 for the sensor assembly and Ex d IIB + H2 Gb, T6, T4, T110C or T130C for the electronics assembly.

The Kurz 454FTB-WGF is Certified Safe for Biogas Applications

Physics backed by scientific testing indicates that the effective temperature of a heated object in relation to ignition is directly correlated to mass. A lesser amount of heated mass means less effective temperature; more heated mass means more effective temperature.

The laws of physics indicate that the net effective ignition temperature of the Kurz WGF sensor at maximum drive under fault conditions will not exceed 90°C above the process temperature.

Therefore, 90°C plus a process temperature limit of 120°C results in a total effective ignition temperature of 210°C. This is far below the ignition temperature of Methane (530°C), given an optimal air/fuel ratio. Under these conditions, the Kurz WGF is incapable of causing an ignition.

Under standard digester conditions, the Kurz WGF produces insufficient heat to initiate a fire. The WGF overheat is also insufficient to ignite the methane should a situation occur where oxygen is introduced into the system.

Kurz flow meters are safe to use in biogas, digester, and landfill applications where condensing gas is present.

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