



THE EXPLOSIMETER

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The Explosimeter is an instrument designed to test for the presence of flammable gases and vapors. It operates on the principle of the balanced electrical circuit, which physicists refer to as a "Wheatstone Bridge." The balanced circuit has two parallel branches of equal resistance. As long as the resistance of the parallel branches remains equal or in "balance" there will be no reading on the meter. The meter, connected across the branches, indicates visually any "unbalance" in the circuit.

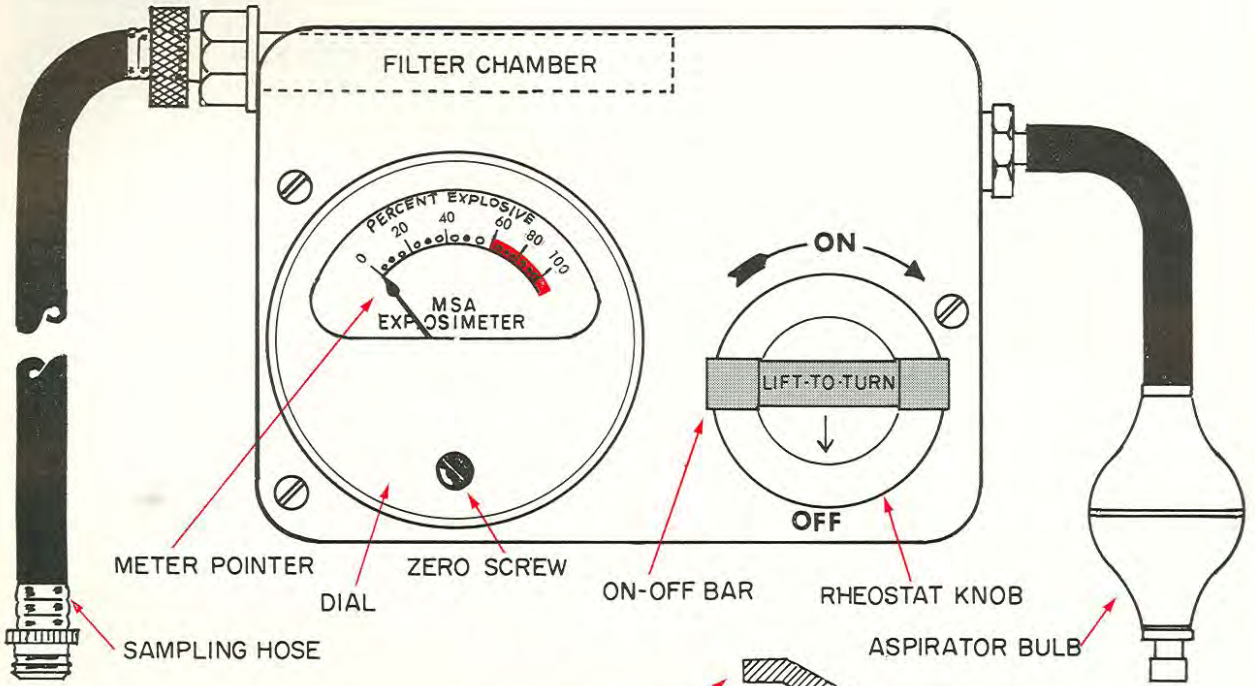
It is known that if the temperature of a wire is increased the electrical resistance is also increased. By actually burning a flammable gas or vapor in the instrument, and permitting one branch (wire) to be affected, it is possible to "unbalance" the circuit. The "unbalance" is measured by the meter located on the face of the Explosimeter.

OPERATING INSTRUCTIONS

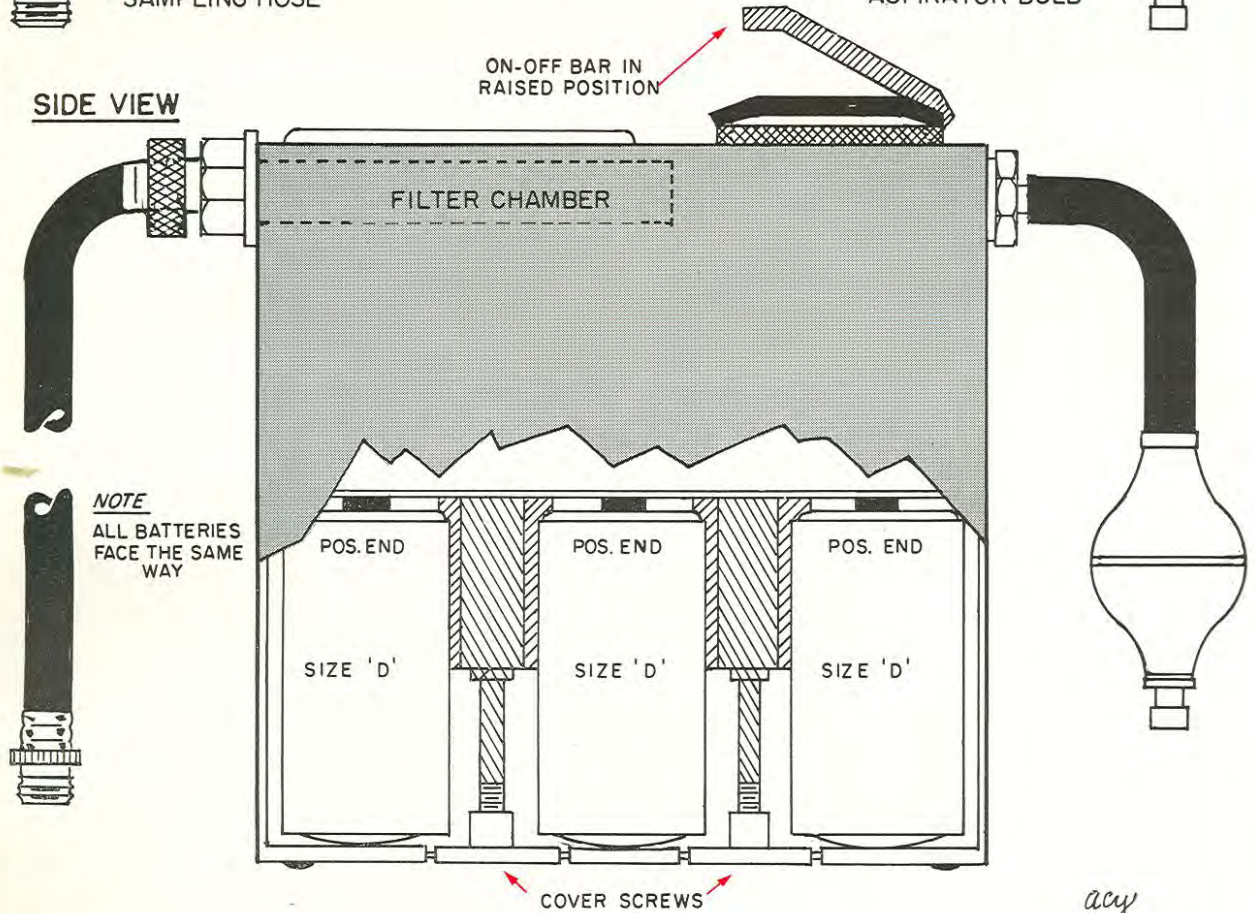
1. Lift bar on rheostat knob until it is almost vertical then turn knob clockwise until the raised end of bar points to the letters "on".
2. Squeeze aspirator bulb several times with fresh air to purge instrument of any combustibles remaining from previous tests. (Do this in fresh air.)
3. Adjust rheostat knob clockwise until meter pointer rests at zero.
4. Place end of sampling line at place where sample is to be taken.
5. Aspirate sample through explosimeter until highest reading on meter is obtained. Approximately five squeezes of the bulb are sufficient to give maximum deflection. If a sampling line is used add two squeezes for each ten feet of line.
6. For best results allow five minute warm up before test is taken.
7. In extremely cold weather transport instrument under turnout coat next to body. (A cold instrument causes condensation to form when a warm vapor is introduced.

EXPLOSIMETER

TOP VIEW



SIDE VIEW



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The reading taken will therefore be lower than actually exists in the area.) By keeping the instrument warm this tendency can be reduced.

The markings on the dial are colored black from zero to 60, and colored red from 60 to 100.

A reading of zero to 60 indicates that there is either *no* combustible gas present or only a *low* concentration of such gas.

A reading of 60 to 100 indicates that the concentration is *approaching* the lower explosive limits.

If the pointer on the dial reaches 100 and remains there it is an indication that the concentration is *at*, or slightly above, the lower explosive limit.

If the pointer on the dial goes over 100 and remains there it is an indication that the concentration is *within* the explosive range.

If the pointer goes above 100 and immediately returns to zero, it is an indication that the concentration is *in, or above, the explosive range* and the mixture is too rich to burn catalytically. It may be ignited by spark or flame.

OPERATIONS

To use the Explosimeter properly it is necessary to follow a simple procedure. A rough drawing of the area to be surveyed is made. At a remote point begin taking samples, and, systematically, work across the area in question. At each point that a sample is taken with the Explosimeter, a chalk mark of the reading is recorded on the floor or ground. This reading is also recorded on the rough drawing, in the approximate position it was made. This simple technique provides a record, and visual indication of the leak pattern.

The point at which the highest percentage of explosive atmosphere is present is, naturally, the logical point to begin searching for the leak.

The Explosimeter can *only* detect gases which burn *and only when oxygen is present for combustion*. It cannot detect gases which are inert, such as: nitrogen, phosgene, or freon, and others. A tank or cellar declared free of an explosive atmosphere by tests with the Explosimeter may have toxic gases present in lethal quantities.

The Explosimeter cannot detect oxygen. While oxygen cannot burn, high concentration of it, combined with other substances, particularly oil, can cause violent explosions.

THE FILAMENT

The filament is simply a wire, one leg, of one branch of the "Wheatstone Bridge". It is made of platinum, and is subject to heat when gases burn in the instrument. The filament life will depend greatly upon the concentrations of gases tested. Normal use, using proper filters, should allow several thousand tests to be made before replacement is necessary. Repeated tests made in excessively rich atmosphere will shorten it's life considerably.

DRY CELLS

The Explosimeter uses six size D or #2 flashlight dry cells operating in parallel. They will give eight to ten hours of continuous service. Considerably longer life may be expected in intermittent service. The dry cells must be replaced when the extreme clockwise position of the rheostat knob fails to bring the pointer to zero.

THE BALLAST LAMP

The ballast lamp makes it practical to adjust the circuit balance and detector operating temperature with a single control. It may glow dimly, but is never brightly illumin-

ated. The lamp should always be kept firmly screwed into it's socket, and never removed from it. It should last throughout the life of the Explosimeter.

FLASHBACK ARRESTORS

The instrument is provided with flashback arrestors which are located at the inlet and outlet of the filament chamber. It is designed to prevent flame propagation from the chamber to a potentially flammable atmosphere.

FILTERS

An integral part of the case of an Explosimeter is the filter chamber. For normal use, a cotton filter is inserted in the Explosimeter. It will tend to remove dust and liquids from the incoming sample.

Atmospheres containing "leaded" gasoline may be tested with an Explosimeter provided a special filter is inserted in the instrument. With repeated exposure to leaded gasoline the filament becomes coated and is less sensitive. The glass and fiber filter is crushed before insertion to release it's chemical catalyst. This substance chemically changes the composition of the leaded compound to a more volatile substance which does not coat the filament.

A special filter, made of activated charcoal, is designed to absorb petroleum vapors. It is useful when two gases or vapors are suspected in an area. Using the cotton filter, run the necessary series of tests. Replace the cotton filter with the charcoal filter and repeat tests. If lower positive readings are recorded this indicates two gases or vapors are present, one of them a petroleum product.

MAINTENANCE

The only servicing permitted by units possessing this equipment is replacing worn batteries and changing filters as necessary. *All other repairs are made by the Mask Service Unit.*

The following is a list of defects which require immediate forwarding of the instrument to the Mask Service Unit for repair:

1. A marked reduction in the speed of response (dial movement).
2. A decrease in the rate of operation of aspirator bulb.
3. An instrument subjected to severe mechanical shock.
4. A meter needle which moves to the extreme right and stays there on being turned on. This indicates a burned out filament.

Note: "D" Batteries are normally removed from the instrument after each use, and stored in the carrying case.

LIMITATIONS

The Explosimeter is designed for a specific function, namely testing for the presence of flammable vapors and gases in atmospheres containing oxygen. Like any good tool, it must be used with common sense. Where high concentrations of steam are present it will not function. If the combustible has a high boiling point, and is tested at normal room temperature it will show a low vapor concentration. A rise of a few hundred degrees in the ambient temperature would make this vapor extremely flammable.

It cannot detect combustible vapors in inert gases, combustible mists or sprays, or explosive dusts. Oxy-Hydrogen, and Oxy-Acetylene mixtures cannot be measured by the instrument. The Explosimeter must never be used in oxygen enriched atmospheres. The standard flame arrestor will not hold flame in the chamber and an explosion in the tested atmosphere may result. ▲