Dilution Tube Instruction Sheet

For Use With the Following Instruments Only:

MODEL	PART NO.
EXPLOSIMETER® COMBUSTIBLE GAS INDICATORS	
Model 2A	89220
Model 2B	456478
Model 2C	468336
Model 3	43351
Model 4	49840
Model 5	73251
COMBUSTIBLE GAS INDICATORS	
Model 20	74767
Model 30	74766
Model 40	74711
Model 60	465475
Model 62	465681
Model 62S	468410
Model 260	449900
Model 261	474149
Model 360	476151
Model 361	476152
Watchman	Assemble to Order

General Description

A Dilution Tube can be used to help estimate or compare concentrations of combustible gases that are in excess of the lower explosive limit (100% LEL instrument meter reading) or when the sampled atmosphere is oxygen-deficient (less than 10% Oxygen).

For example, an insert can be used when testing bar holes in the ground adjacent to a leak from a buried gas pipe, or when following the purging of a closed vessel that has contained flammable gases or vapors.

Dilution Tubes are available in the following ratios:

- 1 to 1 ratio
- 10 to 1 ratio
- 20 to 1 ratio.

They are designed to provide 1 volume of sample in 2, 10, and 20 volumes of the diluted mixture, respectively.

⚠ WARNING

Dilution Tubes must be used only in Fresh Air, and by users who have read these instructions and understand how to interpret readings with Dilution Tubes installed. Use Dilution Tubes only when nitrogen or carbon dioxide are the background inert gases. Other inert gases such as helium, etc., cause erroneous readings as they have a strong thermal conductivity effect on the combustible sensor.

Dilution Tubes must be removed after use to prevent erroneous interpretation of instrument readings. The sample must be drawn from a non-pressurized area only. Pressure (or vacuum) on the sample side or dilution side causes major disruptions of flow balance in the Dilution Tube, resulting in inaccurate readings, possible injury or death.

Operating Instructions for the Following Indicators:

- Model 2A Indicator
- Model 2B Indicator
- Model 2C Indicator
- Model 3 Indicator
- Model 4 Indicator
- Model 5 Indicator
- Model 20 Indicator
- Model 30 Indicator
- Model 40 Indicator.

The Dilution Tube should be connected between the instrument sample inlet and the sampling line. The instrument and the orifice must be in Fresh Air (an area known to be free of combustible gases). The fiber gasket inside the female end of the insert must be in place and in good condition.

To determine the approximate concentration of combustible gas in the sampled atmosphere, the meter reading must be multiplied by the following factors:

- 1 to 1 Dilution Tube:
  multiply meter reading by 2
- 10 to 1 Dilution Tube:
  multiply meter reading by 10
- 20 to 1 Dilution Tube:
  multiply meter reading by 20.

Dilution Tubes should provide sample dilutions within ±10% accuracy when used with a 15-foot sampling line (P/N 11912). Shorter or longer sampling lines may be used, but the accuracy of the dilution will be reduced. With five-foot sampling lines, the readings may be as much as 20% high. With 50-foot lines, readings may be as much as 20% low.

Dilution Tubes

RATIO	PART NO.
1 to 1	85375
10 to 1	45174
20 to 1	11377

Operating Instruction for the Following Indicators:

- Model 260 Indicator
- Model 261 Indicator
- Model 360 Indicator
- Model 361 Indicator
- Watchman® Multigas Monitor.

Dilution Tube (P/N 85375) may also be used with the Model 260, 261, 360, 361 and Watchman Indicators.

1. Using a calibrated Indicator *without* the Dilution Tube, take and record an oxygen reading from the inert area.
2. Attach a Dilution Tube to the Indicator sample inlet and attach the sampling line to the Dilution Tube.
   - Sample lines of up to 15 feet may be used.
   - The Indicator and Dilution Tube must be in Fresh Air (an area known to be free of combustible gases and containing 20.8% oxygen).
3. Sample the inert area again.
   - The oxygen reading should be the average of 20.8 (ambient air) and the previously recorded reading obtained in Step 1.
     - **For example:**
       In an inert atmosphere with 2.0% oxygen, the reading should be 11.4% oxygen:

       $(2.0 + 20.8) \div 2 = 11.4$
   - If the reading is *higher* than your calculation, too much air is entering the fresh air side of the Dilution Tube; check the sample line for obstructions.
   - If the reading is *lower* than your calculation, not enough air is entering the fresh air side of the Dilution Tube; check the dilution inlet for obstructions.
   - Do not use the Indicator unless the oxygen reading equals your calculation ±2.
     - Using the **example** calculation of 11.4, allowable readings range from 9.4 to 13.4.
4. If the oxygen reading is acceptable, you may proceed to monitor for combustible gases in nitrogen or carbon dioxide.

   Multiply the indicator combustible gas reading by 2 for the correct reading.
   - The results will be within ±2% of the readings you would obtain if 20.8% oxygen were present.
5. Remove the Dilution Tube immediately after sampling from the inert area to prevent unintentional use of the Dilution Tube.