Installation, Operating and Maintenance Instructions

K32230
DEW-POINT APPARATUS
APPLICATIONS

This manual has been prepared to assist in the preparation, use and care of the equipment. It is not intended to replace the appropriate method. In all cases the Method of Test should be consulted for full compliance with the requirements ASTM D1142; GPA

Figure 1 - Dewpoint Apparatus
1 DESCRIPTION

The K32230 Dewpoint Apparatus is intended to give an indication of the dryness of commercial Propane and Propane HD5. Figure 1 shows the equipment, which comprises a stainless steel chamber containing a highly polished mirror, which is progressively chilled by a refrigerant. A mercury-in-glass thermometer, with its bulb in contact with the mirror support structure, indicates the temperature of the stainless steel mirror. In use, the propane vapour to be tested flows into the chamber and is deflected across the surface of the mirror. When moisture, present in the propane vapour, condenses on the mirror, the temperature is recorded as the dewpoint of the sample.

WARNING: THE EQUIPMENT USES A MERCURY-IN-GLASS THERMOMETER. IN THE EVENT OF A BREAKAGE IT IS ESSENTIAL THAT ALL RELEVANT HANDLING PRECAUTIONS AND CLEAN UP PROCEDURES ARE FOLLOWED.
2 INSTALLATION

2.1 SAFETY

Users of equipment supplied by Koehler Inst Co, if not themselves fully trained, should at least be under the supervision of a responsible trained person who is familiar with all the relevant laboratory and engineering practices.

All normal and applicable safety precautions must always be observed. It is recommended that the operator wears safety glasses.

It is the responsibility of the users to ensure that the requirements of Section 6(4) of the HEALTH AND SAFETY AT WORK ACT 1974 (as subsequently amended) are fully complied with, and in other countries, such equivalent safety legislation as is applicable.

Equipment is supplied on the strict understanding that the foregoing requirements will be met during use.

2.2 UNPACKING THE KIT

The K32230 should be carefully unpacked on receipt and all packaging removed and stored safely.

2.3 PACKING LIST

The K32230 is despatched fully assembled, but without a thermometer fitted to prevent it being damaged in transit, and is accompanied by these Installation, Operating and Maintenance Instructions.

2.4 SETTING UP

Refer to Figure 2 below.
Figure 2 - Connections to Apparatus

(1) Select a suitable sampling point. The location of the sample point should be chosen to obtain the best possible representative sample of the propane vapour in equilibrium with the liquid phase in the tank. Samples should not be taken from the liquid phase.

(2) Connect the apparatus directly to the vapour space of the tank, tank car or sample cylinder using copper tubing which is completely dry and of suitable pressure rating to withstand the tank pressure.

NOTE: A number of plastic tube linings, used in flexible metal hoses, absorb water. These materials must be avoided or erroneous results may be obtained.

(3) All propane gas, having passed through the apparatus, must be exhausted to a safe area by connecting suitable tubing to the outlet connections.

(4) Ensure that the temperature of the sampling connection and tubing is at least several degrees higher than the dewpoint of the propane being tested. This ensures that water vapour present in the sample does not condense in the tubing prior to the apparatus.

(5) Connect the refrigerant (liquid propane is suitable) either from a tank or a small portable container to the chiller section of the apparatus at the refrigerant flow control valve. Intermittent cracking of this valve permits the refrigerant to expand and chill the test mirror.

(6) Select the appropriate mercury-in-glass thermometer (see Accessories section) and insert it into the tapered thermometer holder, ensuring that the bulb is in contact with the end of the mirror support structure attached to the mirror.

(7) Attach the appropriate pressure gauge (see ASTM D1142 and Accessories section).
3 OPERATION

Refer to Figure 2.

- **Purge the apparatus**
  
  Fully open the sample outlet valve and crack open the inlet valve.

- **Sample the test gas**
  
  Adjust the inlet valve to give a very slow and steady flow of propane vapour out of the sample outlet valve. A rate of flow of approximately 0.05 to 0.5 ft³/minute is satisfactory.

  *NOTE:* A faintly perceptible feeling of gas flow against a moistened finger tip indicates a flow of about 0.5 ft³/min. An excessive sampling rate will give erroneous results.

- **Carry out a preliminary test to determine the approximate dewpoint**
  
  Crack open the refrigerant flow control valve and monitor the temperature on the thermometer while observing the mirror through the viewing port. The cooling rate can be as rapid as desired.

- **Carry out the full test**
  
  1. When the mirror temperature approaches 10°F above the approximate dew point, reduce the cooling rate to below 2°F/minute by adjusting the refrigerant flow control valve. As the mirror is slowly cooled, the propane vapour, deflected across its surface by the propane vapour jet, will deposit a film of moisture on it. At first this appears as a circular spot in the centre of the mirror.
  
  2. After this ‘first spot’ temperature has been recorded, allow the mirror to warm at 2°F/minute by reducing the flow through the refrigerant flow control valve. Record the temperature at which the circular spot disappears.
  
  3. Repeat the cooling and warming sequence several times until the recorded temperatures of appearance and disappearance of the mist spot are within 4°F of each other. The Dew Point is the arithmetical average of these two temperatures. Propane with a dew-point of -15°F or lower should be considered free of moisture.