

D. Mann

75/20

CANADA
DEPARTMENT OF ENERGY MINES AND RESOURCES
MINES BRANCH
OTTAWA

ENERGY RESEARCH LABORATORIES
DIVISIONAL REPORT ERL 75/20
C.E.A.L. No. 346

PERFORMANCE DETERMINATION OF A METHANE DETECTOR
MANUFACTURED BY JOHNSON INSTRUMENT DIVISION OF GASTECH INC.

by

J.A. Bossert

February 1975

PERFORMANCE DETERMINATION OF A METHANE DETECTOR
MANUFACTURED BY JOHNSON INSTRUMENT DIVISION OF GASTECH INC.

by

J.A. Bossert

PURPOSE

We were requested to check the performance calibration and response of a Model 1121 methane detector by the Canadian Standards Association.

APPARATUS AND METHOD

The first preliminary draft of CSA Standard C22.2 No. 152 dated November 1974 was used as a guide in conducting these tests. The specific clauses referred to were Nos. 6.6, 6.7, 6.8 and 6.13 which cover the "Initial Calibration", "Step Change Response", "Flooding" and "Linearity" tests respectively.

The "Initial Calibration" and "Linearity Tests" were performed by making accurate mixtures of methane and air in our Laboratories "Binary Mixture Apparatus" described in CEAL report No. 172 and subsequently filling a deflated plastic bag containing the detector head with the known mixture.

The "Flooding" test was performed by filling a deflated plastic bag containing the sensing head directly from the methane cylinder.

The "step-change" test was performed by putting the detector head in a plastic bag purged with clean air all of which was inside our 70 cu. ft. test chamber. The test chamber was then filled with a 5 per cent mixture of methane in air (100 per cent of the lower flammable limit) and the plastic bag was removed suddenly. The output of the instrument was fed to a chart recorder which recorded the time in seconds and the output of the instrument.

RESULTS

The results of the "linearity test" are recorded in Table 1 and or plotted in Figure 1.

During the "Flooding" test, the alarm point was reached in approximately 2 seconds and the maximum reading was 60 per cent LBL. After 100 per cent gas for 2 minutes, the reading dropped to zero.

The instrument was recalibrated after 5 minutes at 50 per cent LFL and showed a reading of 46 per cent LFL.

In the "step change" test, the instrument showed a 50 per cent reading after 2.9 seconds and a 90 per cent reading after 6.9 seconds.

TABLE 1 - Response to Known Mixtures of Methane in Air

Lower Flammable Limit (% Volume)	Actual Composition		Meter Output % LFL
	% Volume	% LFL	
5.0	0.50	10	10
	1.25	25	22
	2.50	50	50
	3.75	75	82
	5.00	100	115

Figure 1: Actual % LFL VS Meter Reading for Methane/Air Mixtures

