



# **Evaluation of the Tanknology TLD-1 Pipeline Leak Detector for Annual Line Tightness Testing on Flexible Pipelines**

**Addendum to the  
December 29, 1991 Evaluation**

**PREPARED FOR  
Tanknology Corporation International**

**April 30, 1994**



**KEN WILCOX ASSOCIATES, INC. - 19401 E. 40 Highway, Suite 100  
INDEPENDENCE, MO 64055 - (816) 795-7997**

**Evaluation of the Tanknology  
TLD-1 Pipeline Leak Detector  
for Annual Tightness Testing  
on Flexible Pipeline**

**Addendum to the  
December 29, 1991 Evaluation**

**PREPARED FOR  
Tanknology Corporation International  
5225 Hollister St.  
Houston, TX 77040-6294**


**April 30, 1994**

## Preface

The data contained in this report was obtained from the Tanknology TLD-1 Pipeline Leak Detector. This report is to be used in conjunction with the December 29, 1991 evaluation of the Tanknology TLD-1 Pipeline Leak Detector for Annual Tightness Testing. The report contains additional test data that was collected in April, 1994 on flexible pipelines. Testing was performed in accordance with the EPA Pipeline Leak Detection Test Protocol with the exception of the number of tests performed. The results of this abbreviated testing indicate that TLD-1 system will successfully perform on flexible pipeline systems. The work was conducted at the Leak Detection Test Center which is operated by Ken Wilcox Associates, Inc.

Technical questions should be directed to Mr. Barry Williams, Tanknology Corporation International, at (713) 690-8265.

KEN WILCOX ASSOCIATES, INC.



H. Kendall Wilcox, President

April 30, 1994

## **Introduction**

This report is to be used in conjunction with the December 29, 1991 evaluation of the Tanknology TLD-1 Pipeline Leak Detector for Annual Tightness Testing. In 1991, the TLD-1 system was certified to meet the requirements of the U.S. Environmental Protection Agency for Pipeline Leak Detection Systems. The system was certified for Annual Tightness Testing (0.1 gal/h) with a probability of detection ( $P_D$ ) greater than 99.5% and a probability of false alarm ( $P_{FA}$ ) of less than 0.5%.

This report contains additional test data for the TLD-1 system that was conducted in April, 1994 on a 270 ft, 2-in diameter flexible pipeline. Testing was performed in accordance with the EPA Pipeline Leak Detection Test Protocol with the exception of the number of tests performed. The results of this abbreviated testing indicate that TLD-1 system will successfully perform on flexible pipeline systems. The additional testing suggests that the system is acceptable for use on systems of up to 540 ft, of 2 in diameter flexible pipelines.

## **Test Conditions**

The 270 ft Enviroflex flexible pipeline is manufactured by Total Containment and has a volume of 24.8 gal and a bulk modulus of 1,280 psi.

Six additional tests were conducted on the Tanknology system. The test conditions and results for these six tests are in Table 1. Testing was conducted at rates equivalent to 0.1 gal/h at 50 psig for Annual Tightness Testing. Testing was conducted at the temperature extremes of  $\pm 25$  deg F and at neutral. The  $\pm 25$  deg F temperature differences are the extremes required for EPA certification. If a leak detector is successful at these temperature differences, it would also be expected to pass at less extreme temperature differences.

## **Test Results and Discussion**

The performance parameters for the TLD-1 system have been summarized in Table 2. The  $P_D$  was greater than 99.9% and the  $P_{FA}$  was less than 0.1% for the six additional tests. The average test time for the six tests was 2 hours 15 minutes. The thermal effects for flexible pipeline require that a one hour stabilization time occur before a leak rate is reported. Therefore, the minimum test time for flexible pipeline would be 1 hour.

Official EPA certification requires that 25 tight tests and 25 leak tests be conducted at

Tanknology TLD-1

Table 1. Tanknology TD-1 Line Test Data

Test No.	Date Test Began	Duration of Circulation	Time between End of Circulation and Start of Data Collection for Test	Total Test Time	Product/Ground Temperature Difference	Induced Leak Rate	Measured Test Result	Difference between Measured/Induced Leak Rates
	(D-M-Y)	(h-min)	(h-min)	(h-min)	(deg F)	(gal/hr)	(gal/hr)	(gal/hr)
1	12/4/94	1 hr	24 min	1 h 20 min	-1.59	0.000	-0.003	-0.003
2	13/4/94	1 hr	12 min	1 h	-0.76	-0.107	-0.086	0.021
3	15/4/94	1 hr	11 min	2 h 21 min	-25.74	0.000	0.000	0.000
4	18/4/94	1 hr	14 min	2 h 45 min	25.76	-0.092	-0.096	-0.003
5	18/4/94	1 hr	6 min	3 h 23 min	26.19	0.000	-0.007	-0.007
6	19/4/94	1 hr	18 min	2 h 40 min	-25.48	-0.096	-0.082	0.014

**Table 2. Performance Parameters for the TLD-1 Pipeline Leak Detector**

Parameter	Value
<b>Annual Tightness Testing (0.1 gal/h)</b>	
Probability of False Alarm ( $P_{FA}$ )	<0.1%
Probability of Detection ( $P_D$ )	>99.9%
<b>Maximum Line Size</b>	49.6 gal (540 ft of 1.5 in ID
Line)	
<b>Average Waiting Time Delivery of Product</b>	1 hour
<b>Average Test Time</b>	2 hours 15 minutes

## Tanknology TLD-1

various temperatures for Pipeline Leak Detection Systems. Although the Tanknology TLD-1 system has not been re-tested the requisite number of times to receive official EPA certification for flexible pipelines, it is the opinion of Ken Wilcox Associates, Inc. that, based on the test data provided, the TLD-1 system will successfully perform on such pipeline systems.

If the EPA protocol is used to calculate the performance parameters, the TLD-1 system can be used on flexible pipelines up to 49.6 gal (twice the volume of that tested), which is equivalent to 540 ft of 2-in flexible pipeline with a  $P_D$  of 95% or greater and a  $P_{FA}$  of 5% or less.

## Attachment 8

### **Application of the System**

Section 17 of the evaluation forms provides for the application of testing to flexible pipelines. The requirements for Attachment 8 include a justification provided by the manufacturer with concurrence by the evaluator. The attachment is based on extended testing using the EPA protocol procedures on a flexible pipeline system with a bulk modulus much less than the  $25,000 \pm 10,000$  psi specified in the protocol.

The justification for allowing the use of the Tanknology leak detector on flexible pipelines is based on its performance under the most stringent test conditions imposed by the EPA protocol and on its past performance record on other pipelines.

#### **Application to Flexible Pipelines**

The attached report presents the results of testing the Tanknology system on a 270 ft flexible pipeline. Testing was conducted at the two temperature extremes as well as under neutral conditions. The results of the testing on flexible pipelines are consistent with that for rigid lines and meet the performance requirements of the federal EPA.