# UniClean America SEWAGE EFFLUENT TEST KIT

## PERMANGANATE VALUE, pH, TEMPERATURE, SUSPENDED SOLIDS AND PROBABLE BOC, COD AND TOC

Sewage Effluent Kits provide a simple means of checking the quality of sewage effluents.

The tests cover the essential quality control checks required for the day to day operation of sewage works and effluent treatment plants.

It is important that the condition of sewage effluent discharges be checked to ensure they conform to consent limits. Similarly the importance of regular testing by sewage works operators as a check on the efficiency of the works is widely recognised.

Sewage Effluent Kits have been developed to meet this need and are particularly useful at sewage works and other locations without full laboratory facilities. Each of the tests is performed simply without the use of complicated equipment and are suitable for operators without formal training in water testing and analysis.

The Sewage Effluent Tests are based on those recommended by the Department of the Environment and the Water Research Centre and accord generally with the methods laid down in “Analysis of Raw, Potable and Waste Waters” published by HMSO.

The tests offer simplified methods for :

- Permanganate Value (0 - 30+)
- pH value (4 - 10),
- Temperature (0 - 50 °C)
- Turbidity and Suspended Solids (30 - 500)
- Indications of probable BOD, COD and TOC (0 - 45mg/l)

# PERMANGANATE VALUE TEST

The Permanganate Value test is a simplified version of the standard AO test for indicating the general quality of final effluents. The test enables the Permanganate Value (PV) to be determined and the effluent classified as to its acceptability for discharge.

**EQUIPMENT & REAGENTS**

| | |
|---|---|
| 3 x EDT160 | Shaker Tube 100ml |
| 1 x SDT713-300 | Permanaganate Value Tablets (300pk) |
| 6 x SDT714-50 | Acidifying SE Tablets (50pk) |

**Test Procedure :**

1) Take three sample containers and fill each to the 100ml mark with sewage effluent.
2) Add 2 x Acidifying SE tablets to each tube, cap and shake to disintegrate.
3) To the first container add 1 x Permanganate Value tablet, to the second container add 2 x Permanganate value tablets and to the third container add 3 x Permanganate Value tablets. Cap each and shake until tablets are dissolved.
4) Stand for 30 minutes and note how many containers have remained PINK. Read the result from the following table :-

| Containers Pink | Permanganate Value | Grading |
|---|---|---|
| All three | 0 - 10 | Excellent |
| Two | 10 - 20 | Satisfactory |
| One | 20 - 30 | Dubious |
| None | Over 30 | Unsatisfactory |

**Notes :**

1) When testing crude sewage add 10 ml sample to each container and make up to 100ml mark with deionised water. Proceed with the test as described above and multiply the Permanganate value by 10.
2) When testing settled sewage, add 20 ml sample to each container and make up to 100 ml with deionised water. Proceed with the test as described above and multiply the Permanganate value by 5.

# pH 4.0 - 10.0 by Comparator

**Determination of pH (4.0 - 10.0)**

**Step 1.**

Fill both cells with **10ml** of clean sample. (See Note)

Place one cell in the left side of the comparator to act as blank.

**Step 2.**

To the other cell add **1 x Universal pH tablet** and crush to mix.

**Step 3.**

Place in right side of comparator.

**Step 4.**

Rotate disk until colour match is obtained.

Record disk reading.

## HEALTH & SAFETY

Refer to H & P phrases on individual bottles.

Wear protective gloves and safety goggles when performing any tests using corrosive, harmful or irritant reagents.

Do not ingest.

## EQUIPMENT & REAGENTS

| | |
|---|---|
| 1 x 146130 | pH disk (4.0 - 10.0) |
| 1 x EDT085 | Comparator |
| 2 x EDT006 | 10ml Square Plastic Cell |
| 1 x EDT079 | Tablet Crusher |
| 1 x SDT908-50 | Universal pH Tablet (50pk) |

## REFERENCE DATA

**pH = Disk Reading**

# TURBIDITY AND SUSPENDED SOLIDS TEST

The Turbidity Test is designed to give a measure of the suspended solids content of the final effluent. It is also useful in following day to day variation in the quality of sewage and effluent.

The Turbidity Test uses a specially calibrated plastic tube and provides the simplest possible method of performing this important test.

The tube is graduated at 30 to 500 turbidity units on the 13 inch tube.
A double length tube of 26 inches with additional graduations from 5 to 25 turbidity units is optionally available.

**EQUIPMENT & REAGENTS**

1 x EDT009U 13 Inch Turbidity Tube (30-500)

**Test Procedure :**

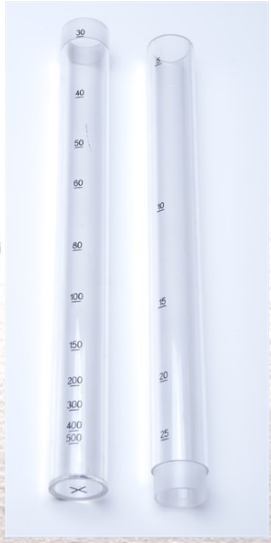
1) Hold the tube vertically over a white surface and view downwards.

2) Gradually pour in the effluent sample until the black cross is just no longer visible.

3) Read of the graduation corresponding to the height of the sample in the tube. This represents the turbidity of the effluent in Jackson Turbidity Units (JTU).

4) For sewage effluents the graduations may also be taken as being approximately equivalent to the Suspended Solids Content as milligrams per litre.

The Royal Commission standards for Effluents recommended that the suspended solids content of sewage effluent should be no more than 30 mg/l.




**Notes :**

1) The tube should be rinsed after each use.

2) Any staining may be removed by the use of a household detergent.

# PROBABLE BOD, COD AND TOC TEST

It is possible to derive an indication of the Biochemical oxygen demand (BOD), Chemical Oxygen demand (COD) and Total Organic carbon (TOC) from the result of the Permanganate Value test.

This is based on the relationship between these measures of organic pollution obtained experimentally for domestic sewage and effluents.

(Notes on Water research, Number 14, Tests for Assessing the Oxygen Demand of effluents, Steven-age Laboratory, Water Research centre, February 1978).

To convert the Permanganate value (PV) for domestic sewage and effluent to probable BOD, COD and TOC values multiply by the following factors:

| | Sewage | Effluent |
|---|---|---|
| **Probable BOD** | PV x 5 | PV x 1.5 |
| **Probable COD** | PV x 10 | PV x 7 |
| **Probable TOC** | PV x 3 | PV x 2 |

There is generally a close relationship between turbidity and the BOD value of settled sewage and effluent. The probable BOD can be calculated from the result of the turbidity test using the following formula :-

$$\text{PROBABLE BOD} = \frac{\text{TURBIDITY}}{2} + 5$$

This probable BOD value can be used as a cross check on the probable BOD value obtained from the relationship with the Permanganate Value Test.

The Royal Commission Standard for Effluents recommends a BOD value of not more than 20 mg/l.

# TEMPERATURE

A check should be maintained on the temperature of effluent discharges and these should always be close to ambient temperatures.

A check is particularly important on Industrial effluents where heated processes are involved.

The Sewage Kit contains a –50 to 125 °C digital pocket thermometer.