



**Fact-sheet – Effluent Treatment Plant (ETP) – Water quality testing**



**What is the objective?**

The objective is to:

- **Control** the wastewater characteristics before, during and after the treatment to control and make sure the treatment process is adapted;
- **Ensure** the quality of water after treatment is within the limits as per law or as per the industry standard.



**How to achieve this objective?**

**Step 1: Identify** which water quality parameters should be tested before, during and after treatment.

Before treatment (ETP inlet)	During treatment	After treatment (ETP outlet)
<ul style="list-style-type: none"> <li>➤ The untreated wastewater characteristics should have been known since the ETP construction project as the ETP has to be designed and built based on the pollution load of the wastewater to be treated.</li> <li>➤ The parameters commonly checked at ETP inlet are:                             <ul style="list-style-type: none"> <li>• pH,</li> <li>• TDS (Total dissolved solids),</li> <li>• Temperature,</li> <li>• DO (Dissolved oxygen),</li> <li>• BOD (Biological oxygen demand)</li> <li>• COD (Chemical oxygen demand)</li> <li>• Oil &amp; grease.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ The ETP operation &amp; maintenance manual should indicate which parameters the operator should test at which stages of the treatment.</li> <li>➤ Testing of water parameters during the process is needed to control the effectiveness of the different treatment steps and to make adjustments if needed.</li> <li>➤ The main important tests to be performed daily are:                             <ul style="list-style-type: none"> <li>• pH in neutralization tank or before the aeration tank (biological process)</li> <li>• DO and Temperature in aeration tank</li> <li>• Mixed Liquor Volatile Suspended Solids (MLVSS) &amp; (MLSS) in aeration tank</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ The factory has to identify the <b>legal standards</b> applicable to its situation: industry standard if any, standard according to discharge point of wastewater after treatment (standard might be different if the wastewater goes to a sewer or to a natural source), local standard if any, etc.</li> <li>➤ The factory might have to comply with other <b>standards as per its stakeholders requirements</b> (e.g. for textile, the buyers might ask the factory to comply with ZDHC Programme’s Wastewater Guideline)</li> <li>➤ Whatever is the law, the parameters tested at ETP inlet point should be tested at ETP outlet point to assess if the water quality after treatment expected is achieved.</li> </ul>

**Step 2: Define** what should be the frequency of the testing. The frequency of testing should be indicated in the ETP operation & maintenance manual. Before treatment, the most important parameters to test are BOD and COD and they can be tested weekly (or monthly for BOD). After treatment, the factory has to refer to the legal requirements as a minimum and whatever is the law, it is recommended to follow this plan:

Daily	Weekly	Quarterly or twice a year
pH, color, DO	Temperature, COD and BOD (can be tested monthly if not possible weekly)	Heavy metals, ammonia, chromium, etc.

**Step 3: Make sure** you have all the instruments you need to perform the tests and make sure you have the testing procedures to test accurately each water quality parameter.



- **Request** calibration<sup>1</sup> certificates and testing procedures when you purchase testing instruments ;
- **Appoint** the ETP manager or a laboratory analyst to be in charge of the water testing and make sure he/she is qualified to collect the samples, perform the tests and report the data (see fact-sheet “ETP operator’s skills and responsibilities”).

<sup>1</sup> **Calibrate:** to check a measuring instrument to see if it is accurate (Source: Cambridge Dictionary). The calibration of an instrument/tool assures that the measurement errors are minor (the error range is kept within the desired limits).

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**Common non-compliances**

**Water quality testing instruments not calibrated**

The factory is using TDS and DO meters for the testing of the water quality after treatment but the ETP operator is not aware of the necessity to verify if the instruments are calibrated or not. Therefore, the results of the tests might not be accurate and reliable.



**Good practices**

The factory should have documented **instructions** about how to perform the water parameters tests.

For example, for the test of Chemical Oxygen Demand (COD), the below instructions can be kept by the ETP operator in the ETP laboratory:

**Oxygen Demand, Chemical**  
 USEPA Reactor Digestion Method DR/CR 316.53.01104  
 LMR (250–15,000 mg/L COD) Method 10212  
 scope and Application: For wastewater and process water, digestion is required. TNTplus™ 823

**Test preparation**

**How to use instrument-specific information**  
 The instrument-specific information table displays requirements that may vary between instruments. To view this table, select an instrument then next access to find the corresponding information required to perform this test.

Instrument	Light source
DR 6000	—
DR 6000	—
DR 3803	LZV889
DR 3803, DR 2808	LZV908

**Before starting the test:**  
 DR 3800, DR 3810, DR 3890: install the IPT at least at 60°C (140°F) before performing this test.  
 Please read Safety Advice and Inspection Data on package.  
 Recommended sample and reagent temperature is (5–25 °C) (55–77 °F).  
 Recommended reagent storage temperature is (5–25 °C) (55–77 °F).  
 Some of the chemicals and apparatus used in this procedure may be hazardous to the health and safety of the user if it is not handled in a safe and controlled manner. Please read all safety and personal MSDS sheets.  
 To fill the optical blank for a set of samples, see Blanks for colorimetric determination.  
 TNTplus methods are activated from the M4+ Menu screen by loading the sample vial into the sample cell holder.  
 Digested reagent will affect test accuracy and is hazardous to skin and other materials. Be prepared to wash spills with running water.  
 When appropriate use protection and clothing for aerosols use protection. If contact occurs, flush the affected area with running water. Review and follow instructions carefully.  
 Store unused high-sensitive vials in a closed box.

**Collect the following items:**

Description	Quantity
Reactor	1
DR3000 Reactor with 13-mm wells (use adapters with 18-mm holes)	1

**Reactor digestion method, TNTplus 823**

- Turn on the DR3000 Reactor. Preheat to 100 °C.
- Homogenize 100 mL of sample for 30 seconds as a blank. For samples containing large amounts of solids, increase the homogenization time. If the sample does not completely suspend solids, omit steps 2 and 3.
- To help ensure that a representative portion of sample is analyzed, pour the homogenized sample into a 250-mL beaker and gently stir with a magnetic stir plate.
- Insert a vial several times to bring the sediment to the bottom of the vial into suspension.

**Reactor digestion method, TNTplus 823 (continued)**

- Insert a vial several times to bring the sediment to the bottom of the vial into suspension.
- Place the vial into the preheated DR3000 Reactor. Close the protective lid.
- Heat for two hours.
- Turn the reactor off. Wait about 20 minutes for the vial to cool to 100 °C or less.
- Insert the vial several times into the rack to cool to room temperature.
- Thoroughly clean the outside of the vial.
- Insert the vial into the cell holder. Close the lid. The instrument reads the blank and reads the sample. Results are in mg/L COD.

**Blanks for colorimetric determination**  
 A reagent blank can be measured or the value subtracted from the results of each test performed using the same reagent lot number. The blank may be used repeatedly for measurements using the same lot of vials. Store it in the dark and monitor decomposition by measuring the concentration periodically.  
 To subtract the value of the blank from a series of measurements:  
 1. Measure the blank in step 12.  
 2. Turn on reagent blank. The measured value of the blank should be displayed in the highlighted box. Accept this value.

Instructions must be in a language understandable by the person in charge to perform the water parameter test.