

HOW TO TREAT SEWAGE FROM AIRPLANES AND TRAINS

The elimination of blue wastewaters (skykem) with advanced technology



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The Problem

This water comes from the use of **aircraft and high-speed trains** toilet by passengers. Before each travel, a **blue color product** (Skykem) that has in its composition a quaternary ammonium germicide and ethylene glycol as antifreeze is added to each box to **prevent microorganism growth**.

Consequently, these waters are murky, blue-green, liquid. Once the discharge and cleaning of these boxes occur, either on airports or train station facilities, **a significant amount of heavily loaded wastewaters is discharged**, requiring proper treatment.

The composition of human urine largely determines **the physical and chemical characteristics of the effluent**, a liter of human urine contains approximately 25 g of urea, 9 g sodium chloride, ammonia, uric acid, and other substances. But in this case, **this type of effluent also contains large quantities of TSS**, as passengers are accustomed to using large quantities of paper, besides the strong contribution of the designated blue color product with its ammonium and ethylene glycol composition.

Studies have shown that this kind of wastewater presents a **high concentration** of SST, COD, a low biodegradability, COD/BOD5, between 0,17 and 0,42, and high concentrations of Cl⁻ and NH₄⁺. The general characteristics may be described as following:.

Parameter	Mean Value	Parameter	Mean Value
pH	8,3±1,4 mg/L	N-NH ₄ ⁺	1725±351 mg/L
Conductivity	11,8±2,9 mS/cm	N _t	1899±244 mg/L
Potencial Redox	-301±289,4 mv	Orthophosphate	14 mg/L
SST	2523±2082 mg/L	N-NO ₃	<1 mg/L
COD	10520±7990 mg/L	N-NO ₂	<1 mg/L
BOD ₅	4450±1789 mg/L	Oils and Fats	170±82 mg/L

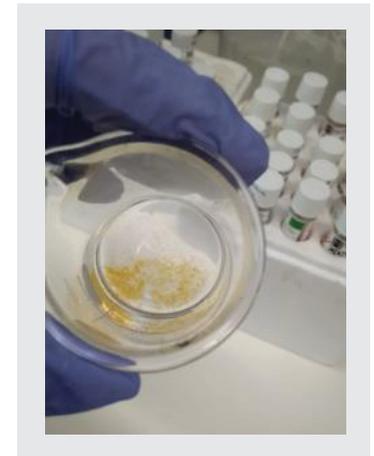
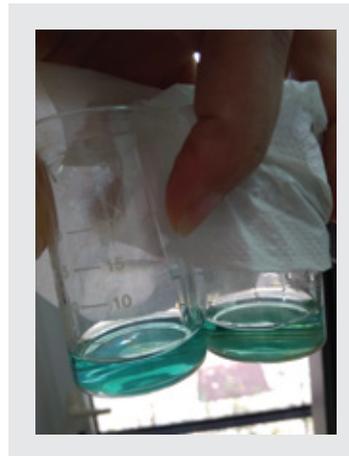
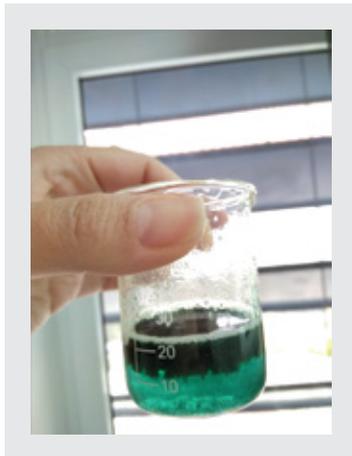


Normally these effluents from aircraft and trains are mixed with the wastewater generated in the buildings of airports and train stations and **treated together in the general biological treatment plants**. However, depending on the relative contribution of these effluents to the total volume, it is common that they can have a **significant negative impact on the performance of these facilities**, due to their characteristics and levels of contamination, making it essential that an adequate pretreatment is carried out before this mixture occurs.

The Solution

VentilAQUA developed a treatment solution based on the **Advanced Oxidation** process, in this particular case, using and electro-oxidation technology, or so-called **Electrocoagulation**.

The Electrocoagulation process as proved to be very efficient on the **load reduction** of these wastewaters and **eliminating the germicide properties** of the quaternary ammonium, thus allowing to have an efficient secondary treatment stage on a biological plant. Also, combining with **ozone oxidation**, an effective color removal will be reached **eliminating the characteristic blue color of these waters**.



Results

DATA RESULTS:

Inlet parameters :

COD - 10520 +/- 7990 mg/l
SST - 2523 +/- 2082 mg/l
Oils and Fats - 170 +/- 82 mg/l
Total Nitrogen - 1899 +/- 244 mg/l

Outlet parameters :

COD 500 - 1500 mg/l
SST - 50 - 100 mg/l
Oils and Fats - 10 - 15 mg/l
Total Nitrogen - 600 - 700 mg/l

