# Title: EPRBB3790FX IC 4 Implementation of an on-line continuous aluminium monitor – v1.1

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## 1. Terms of Reference:

Improvement condition; IC 4 of permit number EPR/BB3790FX issued on the 24th June 2020 requires AluK to continue with the programme to implement the use of an on-line continuous aluminium monitor to measure the aluminium in the point source emissions to sewer contained in Table S3.3 of permit EPR/BB3790FX.

An interim report shall be submitted to Natural Resources Wales identifying progress towards this by the due date and then again upon completion by the following dates specified:

6 months from date of permit issue for interim report - complete by 24th December 2020
9 months from date of permit issue for final report - complete by 24th March 2021

## 2. Executive Summary:

Due to the progress made on the implementation of the on-line continuous aluminium monitor this document will combine the interim and final reports as outlined in the terms of reference.

On the 3rd June 2020 Partech attended site to install and commission an on-line continuous aluminium monitor.

The installed monitor is a Micromac C aluminium online analyser system.

The monitor has been in operation for 14 weeks and is set to sample at 1-hour intervals.

## 3. Findings:

### a) Micromac C aluminium online analyser system

On the 3rd June 2020 Partech attended the AluK site to install a Micromac C aluminium online analyser system.

The Micromac C is a microprocessor controlled online analyzer specifically designed for automatic aluminum monitoring.

The equipment is designed for industrial and environmental online applications, with complete separation between electronics and hydraulics plus a simple and robust Loop Flow Analysis hydraulics system that allows easy maintenance and long-term reliable operation.

### b) Operating principal

A representative sample from a channel or chamber is supplied to the Micromac C analyser. The analyser will then process the sample to provide the measured value which is made available from the analyser and via the 4-20mA and relay outputs.

The analyser is programmed to analyse at a set interval, hourly at AluK. Using a peristaltic sample pump, the analyser will take its sample from the sample pot assembly.

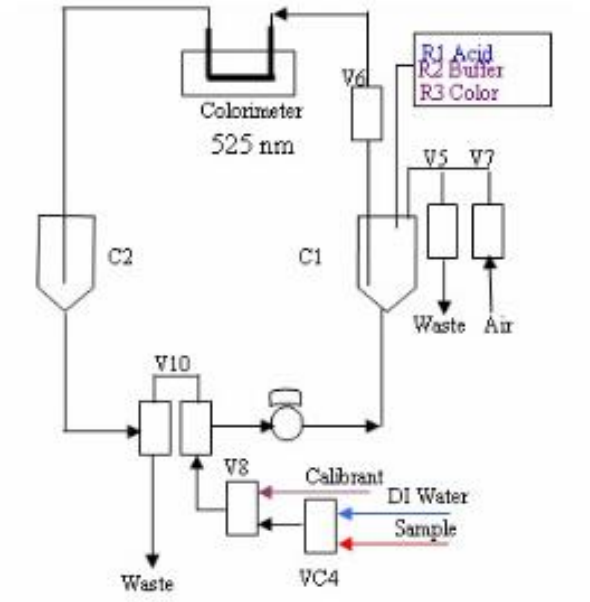
The sample pump will run for a short duration (typically 60 -90 seconds), this will provide a fresh sample in the sample pot. The pump will allow the analyser to take it's sample and will then operate in a reverse direction to expel surplus sample and to empty the sample line.

### c) Aluminum measuring principle and hydraulic diagram

In this automated method, the sample is pumped inside the Loop Flow Analysis reactor; Eriochrome cyanine R dye, diluted aluminum solutions buffered to a pH of 6.0, is added to the sample and it produces a red to pink complex that is colorimetrically measured at 525 nm.

The intensity of the developed color is influenced by the aluminum concentration, reaction time, temperature, pH, alkalinity, and concentration of other ions in the sample. The interference of iron and manganese, two elements often found in water, is eliminated by adding ascorbic acid.

Hydraulic diagram




**d) Training**

The Maintenance Manager has received training on the maintenance and operation of the Partech Micromac C aluminium online analyser system. The certificate of training is available upon request.

## 4. Conclusion:

AluK have now completed their programme to implement the use of an on-line continuous aluminium monitor.