



In the above illustration, 20% hexafluorosilicic acid solution is held in a Bulk Storage Tank (1) within a bunded area (2). To prepare it for use, the solution is pumped through an Automatic Dilution Plant (3) (reducing the concentration to 2% for ease of dosing control) to a Day Tank (4).

The Day Tank (4) holds approximately one day's supply of acid. To prevent the possibility of overdosing (due to plant failure) it is only replenished once in any 24 hour period.

A fluoride injection pump (5) connected to the outlet line from the Day Tank pumps the dilute solution into the potable water supply. Sample supply to the 8231 fluoride monitor (6) is taken after the main supply pumps (7) to ensure adequate mixing and therefore that a representative sample is taken.

The fluoride injection pump (5) is typically variable speed/variable stroke. Pump speed is determined by the plant

flow throughput and the pump stroke is controlled by the output (9) from the 8231 fluoride monitor (6).

Examples of typical alarm levels and settings for the above installation are:

- low concentration alarm (8) – set to activate at  $0.8 \text{ mg/l}^{-1}$  fluoride,
- high concentration alarm (8) – set to activate at  $1.2 \text{ mg/l}^{-1}$  (also set to shut down the fluoridation plant),
- an alarm delay set to hold alarms for 5 minutes before activation.
- calibration points:  $0.5 \text{ mg/l}^{-1} \text{ F}$  and  $1.5 \text{ mg/l}^{-1} \text{ F}$  (as required by the Drinking Water Inspectorate – DWI – in the UK).

## Why use a Fluoride Monitor?

- ▶ An on-line fluoride monitor:
  - continuously monitors the fluoride content of water leaving the plant – *thus ensuring compliance with legislative requirements*,
  - initiates fail-safe plant shutdown if a monitor/controller fails,
  - ensures the final treated water complies with regulatory requirements (DWI within the UK).

## Why use ABB?

- ▶ Our monitor offers unrivalled accuracy across the measurement range – accuracies better than  $\pm 5\%$  of reading or  $\pm 0.1\text{mg/l}^{-1}$  can be achieved.
- ▶ Low on-going costs – reagent, operating and maintenance.
- ▶ Minimal maintenance – routine operator involvement is only:
  - a four-weekly replenishment of reagent,
  - a twelve-monthly service, guaranteed through the use of specially developed long-life pump tubing.
- ▶ The single consumable spares kit included with the monitor:
  - includes 2-years supply of all necessary spares and peripheral items (from date of commissioning),
  - has no hidden extras.
- ▶ Our products feature proven reliability – we have over 100 years of process instrumentation experience.
- ▶ Full installation, commissioning and routine servicing is available.

## What ABB Products are Suitable?

- ▶ **Model 8231 Fluoride Monitor**
  - Electronics protection to IP65.
  - Uses a fluoride ion-selective and reference electrode pair manufactured by ABB – mounted in a temperature controlled flowcell.
  - Two high/low concentration alarms can be generated and sent back to main control unit.
  - Diagnostics displayed locally and available as master alarm for transmission back to a main control unit.
  - Current output (one as standard, second optional) can be expanded to show an expanded window of the overall range of the monitor and can be output to a local recorder or DCS system.
  - Programmable delay and hysteresis functions avoid false alarms causing subsequent control problems.
  - Optional serial communications link for computer interface is available.
  - Calibration points (automatic two-point calibration) can be set closely to the legal dosed limit of  $1.0\text{mg/l F}$ , eg.  $0.5\text{mg/l}$  at  $1.5\text{mg/l F}^{+1}$  thereby ensuring maximum accuracy at the control point of  $1.0\text{mg/l F}^{-1}$ .

## Associated ABB Products for use in Potable Water Treatment Plant

### ▶ Analytical Applications

- Ammonia monitors on the inlet and final treated outlet water.
- Nitrate monitors at the de-nitrification stage to control nitrate removal and at the final treated outfall to ensure that discharge consent limits are met.
- Phosphate monitors on the inlet and final treated water (if phosphoric acid addition being made).
- pH transmitters on the inlet, coagulation, lime addition and final treated water.
- Dissolved oxygen monitors (with type 9408 measuring system) for reservoir storage.
- Turbidity monitors on the inlet, clarifiers, filters and final treated water.
- Process recorder for validation of measurements.

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