



APPLICATION NOTE

Refillable Ion Exchange Resin Column

When sampling water and steam in the power plant cycle, it is often desirable to enhance conductivity reading by the use of a hydrogen ion exchange unit, commonly called a cation column. Very simply, the cation column converts positive ions in the solution into hydrogen ions. This reduces the conductivity effect of alkalizing species (such as hydrazine and amines) and increases the reading due to dissolved mineral salts (which are converted into their corresponding acids). Carbon dioxide, in the form of carbonic acid, passes through unchanged. Thus, a condenser leak or air intrusion can be detected more quickly and reliably. In many applications a conductivity reading of a sample is measured before it enters the cation column and immediately after it exits the column. This technique provides enough information to obtain both the cation conductivity and specific conductivity of a sample. In order to obtain the accuracy required by modern standards, a resin column with high performance is required.

Sentry has long recognized the need for high quality refillable column. A few vendors offer refillable resin column, but none meet the particular performance criteria of the power industry. To meet this need, Sentry has produced a refillable resin column that offers better performance and higher quality than previously available.

Sentry's column is made from carefully selected materials to assure accurate sample analysis. The tube is made from virgin polycarbonate. The removable end caps are made of Delrin. The porous distribution disk is polyethylene, and the sealing gasket is made from nitrile. There are no glues or PVC used in the cartridge that could leach contaminants back into the samples.

The standard design has 1/8" barbed quick disconnect fittings which allow very easy removal of the cartridge.

The Sentry cation column features a long, slim design which produces higher velocities and a better flow distribution at low flow rates. These design features achieve an optimum resin efficiency with superior performance at typical flow rates required by conductivity analyzers.



NOTE:

The resin column is designed for water flow from top to bottom. Color change of the resin will progress from top to bottom with use. When the color change reaches the level indicator on the label, it is time to change the resin.

APPLICATION NOTE

REFILLABLE ION EXCHANGE RESIN COLUMN

FEATURES/BENEFITS

Performance: ASTM and EPRI have conducted extensive studies showing that at low velocities a cation exchange column can lose its effectiveness. Sentry has recognized this problem and has designed a column that performs best at flow rates of approximately 200 cc/min. Sentry's slim design produces velocities that are four times as great as other columns at the same flow rate. High velocities also produce a better flow distribution through the column that minimizes the channeling of flow and allows all of the resin to be used.

Lag Time: In power plant operation, it is vital to detect a chemical upset within minutes of the occurrence. A cation column, by its very nature, is a relatively large vessel compared to the sample tubing. A small flow of fresh sample is constantly being diluted by the old mixture in the column. As a result, there is a time lag between a change in the incoming sample and a measurable change in the outgoing stream. This can delay detection of an upset by 15 minutes to as much as one hour.

Representative Sampling: When a chemical upset occurs, nearly five resin cartridge volumes of sample must pass through a column before a representative sample is obtained. If a column with a large resin volume is used for low flow applications, it acts as a dampener, reducing any peaks or fluctuation in outlet conductivity. These conductivity spikes might be the early warning signs of condenser leaks or other system failures. Sentry's column has a small dead volume that produces highly representative sampling at flow rates of around 200 cc/min.

Life of Refill: The terminology "life of refill" refers to the amount of time that a resin column can operate before the resin has expired. There are three major factors that determine how long a resin column charge will last: volume of resin, electrolytic conditions, and flow rate of sample. Because these conditions can change from customer to customer, it is difficult to estimate how often a resin refill will be required. The life will be roughly proportional to the volume of cation resin. In most cases, however, the Sentry column will provide longer life than this comparison would indicate since the long, slim design results in more effective use of the resin.

Construction: Sentry's refillable resin column is constructed of only the best materials suited for high purity water analysis.

Servicing Columns: Cation resin is a rather tricky material to work with. It consists of encapsulated hydrogen (H+) in polymer beads. It is not harmful and does not smell, but it has a static charge and will cling to everything that it contacts. Other items that need to be serviced are the flow distribution disks and the o-rings.

▲WARNING

It is solely the responsibility of the end-user, through its own analysis and testing, to select products and materials suitable for their specific application requirements, ensure they are properly installed, safely applied, properly maintained, and limit their use to their intended purpose. Improper selection, installation, or use may result in personal injury or property damage.



SENTRY EQUIPMENT CORP

PO Box 127
Oconomowoc, WI 53066 USA
Phone: 262-567-7256
Fax: 262-567-4523

E-mail:
sales@sentry-equip.com

Website:
www.sentry-equip.com

For further information, contact: