Efficient Removal of Perchlorate with Lewatit® TP 106 Ion Exchange Resin

Lewatit® TP 106 is a new gel-type strong base anion exchange resin that is highly efficient for the removal of soft and toxic anions such as perchlorate (ClO_4^-), chlorate (ClO_3^-), bromate (BrO_3^-), and nitrate (NO_3^-). The special bead distribution of our new product development allows the resin to be operated at very high flow rates, which is crucial for surface water and groundwater treatment.

Applications

Perchlorate is a toxic water contaminant and especially harmful to infants. Because of the interference with the human body's ability to absorb iodine into the thyroid gland, perchlorate causes neurological damage. Groundwater is contaminated with perchlorate by military operations from missile fuel, fireworks, and fertilizer. As a result, California and Massachusetts set a preliminary maximum tolerated level of perchlorate for drinking water of 6 and 2 ppb, respectively. Because of its high solubility in water and its persistence in the environment, an efficient liquid purification technology is required to remove perchlorate.

Benefits

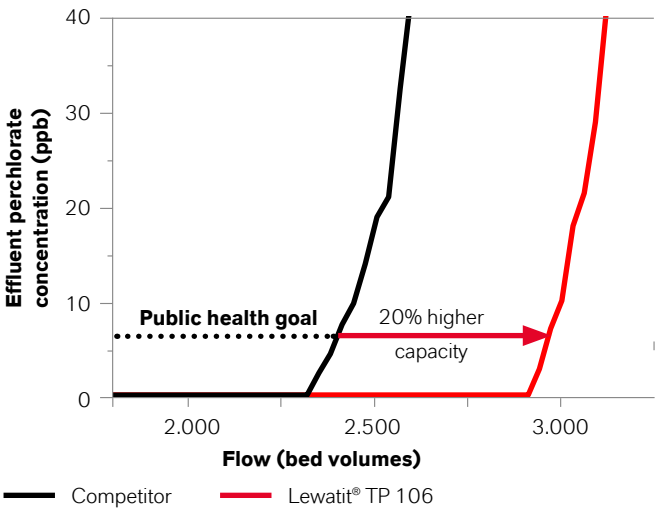
- Up to 20% higher perchlorate removal capacities compared to competitor resins
- Long resin lifetime provides savings on capital investment costs
- High capacity up to 70 g/l even in presence of background constituents such as chloride and sulfate
- Legal requirements regarding discharge limits are fulfilled in a cost-efficient manner
- High perchlorate selectivity provides low leakage after operation and convenient disposal of the single-use resin

Lewatit®

Groundwater purification

In order to face this challenge, LANXESS has developed the novel ion exchange resin Lewatit® TP 106, which enables our customers to generate virtually perchlorate-free water. Lewatit® TP 106 (red) can be operated 20% longer than the competitor resin (black) until the public health goal of 6 ppb is reached. As a result, customers need to replace ion exchange resin less frequently and achieve savings on investment costs.

Figure 1: Breakthrough curves depicting the concentration of perchlorate determined by ion chromatography in the effluent of the ion exchange column in dependence on the treated water volume.

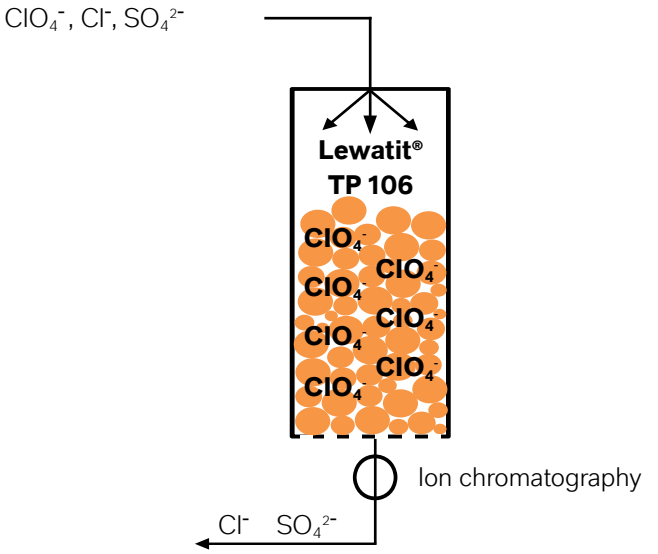


Feed composition
$[ClO_4^-]$ = 20 ppm
$[SO_4^{2-}]$ = 20 ppm
$[Cl^-]$ = 20 ppm
$[NO_3^-]$ = 10 ppm
pH = 7

Specific flow = 20 BV/h

The perchlorate (ClO_4^-) contaminated drinking water enters the Lewatit® TP 106 filled ion exchange column. Due to the outstanding selectivity of Lewatit® TP 106, the perchlorate is removed exclusively. Other water constituents like sulfate (SO_4^{2-}) and chloride (Cl^-) are passed through the resin, which generates a highly efficient process and tasty drinking water.

Figure 2: Schematic representation of the perchlorate removal process.



Certifications

Lewatit® TP 106 is in compliance with the "NSF/ANSI Standard 61" for health-related implications of drinking water system components and certified by the Water Quality Association (WQA). For more information please visit www.wqa.org

We will be happy to support your business. Please contact us for additional information: visit www.lpt.lanxess.com

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