

Giardia and Cryptosporidium Removal

Performance Evaluation MEL-BF and MEL-PF Technology, MEL Technical Bulletin No. 2

The performance evaluation was conducted by Lethbridge College (Lethbridge, Alberta)¹ and Hyperion Research Ltd. (Medicine Hat, Alberta)² on behalf of Manz Engineering Ltd. using pilot filters provided by Manz Engineering Ltd. (See Technical Bulletin No. 1 for description of pilot filter.) Details of the MEL-BF and MEL-PF technology may be found in www.manzwaterinfo.ca. The performance evaluation is unique in that live parasites were used in the testing procedure.

Objective

The objective of the study was to assess the ability of MEL-BF and MEL-PF technology to remove *Cryptosporidium* oocysts and *Giardia* cysts from both chlorinated and dechlorinated municipal water (considered worst case scenarios but also typical of urban water supplies in developing countries where municipal water often alternates between chlorinated and unchlorinated.)

Methodology

Three separate inoculation tests were performed using the pilot filter provided by Manz Engineering Ltd. with surface loading rates of 400 L/h/m², 600 L/h/m², and 1000 L/h/m². Both chlorinated and dechlorinated water were used in the tests.

Each test required the inoculation of approximately 1.0 x 10⁶ *Cryptosporidium* oocysts and *Giardia* cysts. The live oocysts and cysts were supplied by Hyperion Research Ltd. (Medicine Hat, Alberta). The two selected lab strains were, *Cryptosporidium* oocysts (AZ-1 strain, lot C48025b) and the *Giardia* cysts (environmental isolate associated with an outbreak of human giardiasis, lot G54005). The oocysts and cysts in the filter effluent were captured using an Envirochek HV filter (Pall Canada, Mississauga, ON). The concentration of oocysts and cysts in the filtered water was determined using the EPA 1623 method for isolating *Cryptosporidium* (and *Giardia*) in water by filtration, immunomagnetic separation and immunofluorescence.

All testing was performed in the Hyperion Research Ltd. laboratory in Medicine Hat, Alberta.

Results

The MEL-BF and MEL-PF technology demonstrated 4 log removal of both *Cryptosporidium* oocysts and *Giardia* cysts at all surface loading rates considered. (99.99% removals.)

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