

*Centra-flo™ Gravity Sand Filter  
Pilot Testing at  
Valley Coca-Cola Bottling Company  
McAllen, Texas*

*June 26, 1993 thru July 8, 1993*

*Prepared by  
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## Introduction

*Through arrangements made with National Water Systems, Coca-Cola Enterprises, and Valley Coca-Cola Bottling Co., a Model CF-3 Centra-flo Gravity Sand Filter was tested on city drinking water from the McAllen Water Treatment Plant. The water source is the Rio Grande River. The CF-3 is a two foot diameter filter with approximately 3 square feet of plan surface area.*

## Test Objectives

*The main objective of the test was to determine the operating and performance capabilities of the Centra-flo Gravity Sand Filter. The test was to be performed side-by-side with the existing 78" diameter pressure filters installed in the Spring of 1993. Data was to be collected simultaneously and recorded. The performance of the units was to be compared by the following parameters at a minimum:*

*Flow capacity per sqft of plan area  
SDI of effluent*

*The primary goal of the test for Applied Process Technology was to determine the Centra-flo's capability to reduce influent SDI to 5 or below to meet the requirements of the R-O system manufacturer.*

## Test Performance

*The test was conducted from June 26, 1993 to July 8, 1993. The unit was shut down from July 2 to July 5 to observe the holiday. During the 9 day test the Centra-flo was operated 24 hours a day without any shutdown or lost operational time.*

*The unit performed very well and met the requirements of an SDI less than 5 on a regular and consistent basis. The test data can be found attached on Table 1. During steady state operation, flow was maintained at 12.75 gpm representing a hydraulic loading rate of 4.25 gpm/sqft. During this steady state operation the SDI for the Centra-flo averaged 3.66 with a low of 3.44. The city water and the existing pressure filters were tested during this same time and had an SDI reading of 16.41 and 3.55 respectfully.*

*Ferric Sulfate was added to the incoming city water supply for coagulation at a rate averaging 3.63 ppm. This is less than was recommended. Reject flow rates for this test are inflated due to the small size of the filter and the low flow to the filter. The washbox must have a pre-determined optimum flow rate to carry out the accumulated solids from the filter bed. This flow rate will be inflated on the smaller filters because of the low flow rate. As the filters increase in size this optimum*

*flow becomes a much smaller percentage of the total flow to the filter. For example, the reject flow for the CF-3 as tested had an average influent flow of 12.5 gpm and an average reject flow rate of 1.93 gpm or 15%. This is highly inflated. On a Model CF-50, the design flow to the filter is 250 gpm with a reject flow rate of 12.5 gpm or 5% of the total flow to the filter. This is the design reject rate for all filters other than the CF-3.*

### Laboratory Analysis

*All data was collected by Applied Process Technology and recorded. Plant personnel witnessed SDI testing and procedures were reviewed and discussed to ensure proper understanding and test protocol. NTU readings were done on all samples on a Hach P2100 portable Turbidimeter furnished by National Water Systems.*

### Considerations

*The Centra-flo utilizes a high quality multi-grade silica sand. The mixture for this particular test was 13.33% 8-12, 53.33% 12-20, and 33.33% 16-30. This media mixture is typical, however it is quite large for this particular application. This mixture can be tightened up substantially utilizing a finer grade media, thus ensuring even better performance and lower SDI reading. The one drawback to this will be a small increase in the pressure drop across the filter.*

*Another consideration is the diameter of the filter. Being only 2', the fastest moving, dirtiest sand in the filter is only 5" from the face of the filtrate nozzle. In a larger filter, for example a CF-78, this 5" dimension becomes approximately 51" (10 times the distance). This will also ensure better performance and a lower SDI reading.*

### Conclusion

*Based on the pilot unit test conducted, the Centra-flo Gravity Sand Filter will reduce the influent SDI to less than 5 as required by the R-O membrane supplier. The unit can also save a tremendous amount of operational and maintenance costs as well as initial capital with the elimination of 90% of the pneumatic valves and associated equipment.*

*Applied Process Technology would like to thank Mr. Larry Hanner, Plant Manager and Mr. Albert Garcia, Quality Assurance Manager of Valley Coca-Cola Bottling for their hospitality and assistance during the test. It was appreciated very much.*

*Respectfully,  
APPLIED PROCESS TECHNOLOGY, INC.  
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attachments*