

NORIT GRANULAR CARBON PROVES SUPERIOR FOR TOC REDUCTION AT OK WATER TREATMENT PLANT

HYDRODARCO® 3000 replaced bituminous-based GAC

The Arcadia Water Treatment Plant serves the City of Edmond, OK, 15 miles north of Oklahoma City, OK. The facility takes in raw water from Arcadia Lake, a man-made reservoir commissioned as part of the Flood Control Act of 1970.

Plant lab tests demonstrated that a lignite-based granular activated carbon (GAC) should be the superior media for reduction of Total Organic Carbon (TOC). TOC is a main criterion used by Arcadia to judge finished potable water quality.

In February 1993, NORIT Americas Inc. lignite-based HYDRODARCO® 3000 replaced bituminous-based GAC service carbon in the two post-filter contactors.

Two automatic backwash (ABW) filters contain the GAC. Each filter holds approximately 2240 cubic feet of GAC. The media portion is divided into cells with a capacity of 64 ft³ each. At plant capacity of six million gallons per day, the empty bed contact time (EBCT) of the water with the carbon is approximately six minutes.



Case study monitors adsorptive capacity and physical properties

At the time of the changeout, a case study was begun to monitor the adsorptive capacity and physical properties of the GAC while in service. Samples were collected multiple times a year and analyzed, and GAC performance was determined by adsorptive tests including Molasses R.E. and Molasses Number, Iodine Number, and Tannin Value; and by particle parameters including Geometric Mean Diameter, Effective Size, and Uniformity Coefficient.

Molasses R.E. quantifies the ultimate loading capacity of a given GAC. After 28 months of service, R.E. value had decreased by 25 percent, indicating significant capacity for adsorption of large impurities still remained. Molasses Number and Iodine Number both showed gradual decline over the 28 months of testing, indicating steady and progressive utilization of adsorption sites. Tannin Value increased gradually, indicating the carbon was exposed to fairly constant levels of larger organics.

The Geometric Mean Diameter remained stable once early backwashing problems were resolved, as did the Effective Size and Uniformity Coefficient. This demonstrated that there was no significant particle size degradation of the GAC over the test period. Also, bed depth measurements confirmed that there was no gradual loss of carbon from the contactors.

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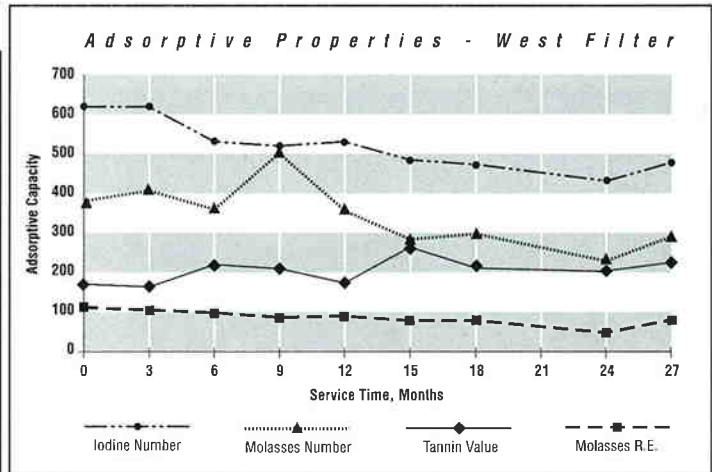
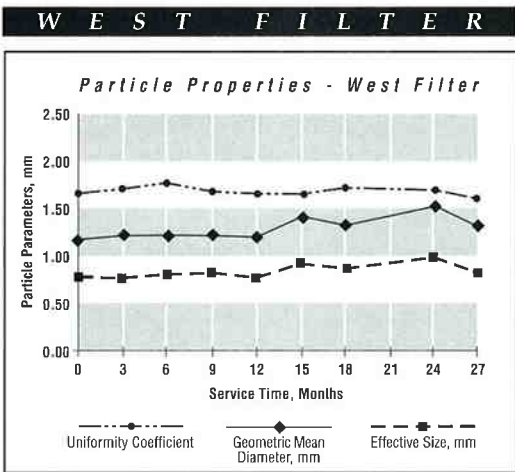
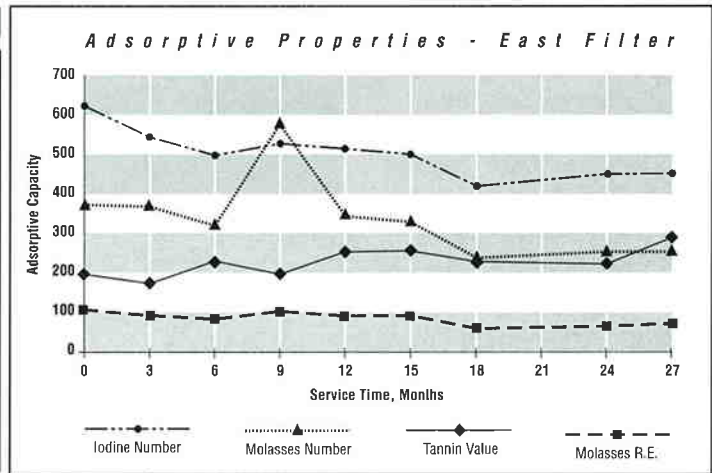
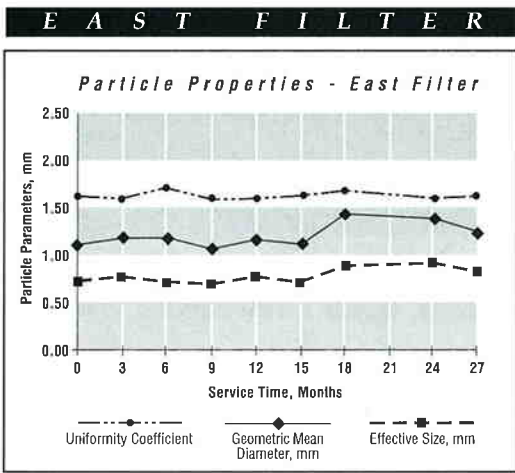
Service carbon versus virgin properties indicate that the NORIT HYDRODARCO® 3000 GAC had adsorptive capacity remaining after three years in service.

Particle parameters indicate that the NORIT HYDRODARCO® 3000 GAC had not broken down or been lost from the filters, even with daily backwashing. The high flowrate backwashing regimen used to re-establish

turbidity reduction potential to the GAC beds did not result in a significant loss or breakdown of the activated carbon, either.

Edmond Water Resources Director Adrain Snider states, “The HYDRODARCO® 3000 removes TOC much better than what we used before. We saw dramatic results when we started using HYDRODARCO® 3000.

“NORIT gives us excellent service, too. They bend over backward to work with us. If we call them, they’re here within hours to help,” adds Mr. Snider.



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