



NORIT  
ACTIVATED CARBON

Water Treatment Services | Wastewater

# CONDENSATE TREATMENT

# 3 NORIT® Activated Carbons

## 1. Application Scope

- Condensate treatment for boiler water recycling
- Silica sensitive high-pressure boilers

### Out-of-Scope

For standard, non-silica-sensitive boiler feed water applications we offer a different portfolio.

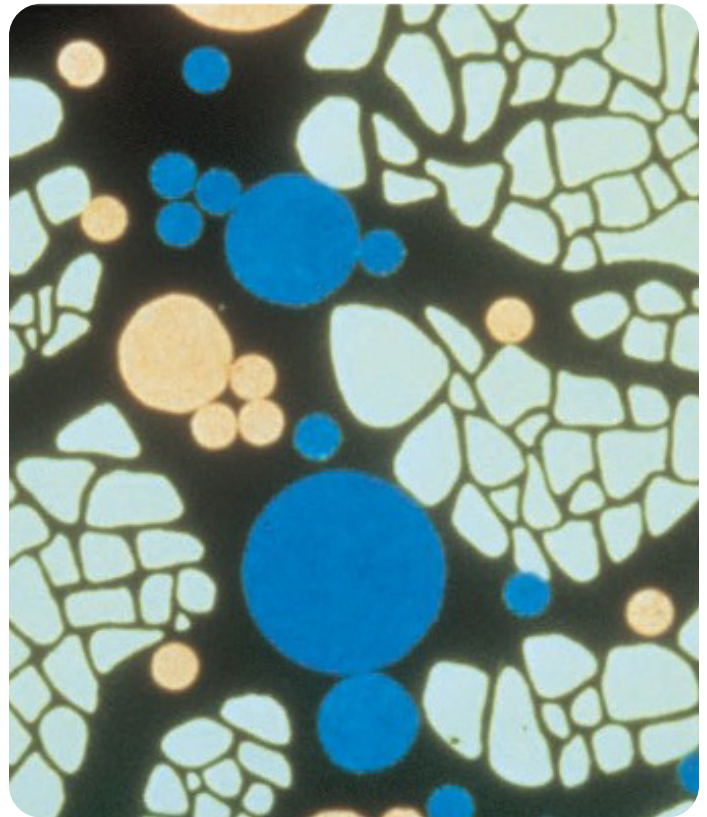
## 2. Key Activated Carbon Performance Criteria

The activated carbon serves to:

- Remove organic contaminants from the condensate water that would otherwise foul ion exchange resins and/or form a tarry/coke layer in boiler tubes.
- Organic contaminants can be low or high molecular weight, small or large molecules, depending on their origin (process streams, lubricants)

The activated carbon should not:

- Release more than a minimal amount of silica, as silica is deposited in the boiler tubes reducing their performance, and/or leads to higher ion exchange regeneration costs
- Require a high volume of water to reach acceptable silica levels during filter startup



## 3. NORIT Activated Carbon Grades:

	NORIT ROY 0.8	NORIT GCNY	NORIT GCN PLUS
Capacity for small sized organic contaminants, e.g.: <ul style="list-style-type: none"> <li>• Light oil fractions, volatile aliphatics/ aromatics</li> <li>• Light lubricant oils</li> </ul>	+++	++	++
Capacity for large sized organic contaminants, e.g.: <ul style="list-style-type: none"> <li>• Heavy oil fractions, Polycyclic Aromatic Hydrocarbons</li> <li>• Lubricant grease components: heavy lubricant oils, surfactants, micelles, polymer additives</li> </ul>	+++	+	+
Low silica leaching	+++	++	+
Low required startup water volume (to reach the low silica leaching)	+++	++	+

# Product Performance: Organic Foulant Removal

## NORIT ROY 0.8

### Analytics<sup>1</sup> & Features

- **Iodine number  $\geq 1200$ :** Very high capacity for small molecules (Highly developed microporosity)
- **HHA Number  $\geq 12.5$ :** Very high capacity for large molecules (Highly developed mesoporosity)

### Comparative Benefits

- Removes both small (light oil fractions, light lubricant oils) and large sized organic contaminants (PAHs, heavy oils fractions, lubricant grease components: polymers, surfactants, etc.)
- Best overall protection of downstream resins and boiler against organic foulants
- Longest service life expectancy

## NORIT GCNY 1240, NORIT GCN 830 PLUS, NORIT GCN 1240 PLUS

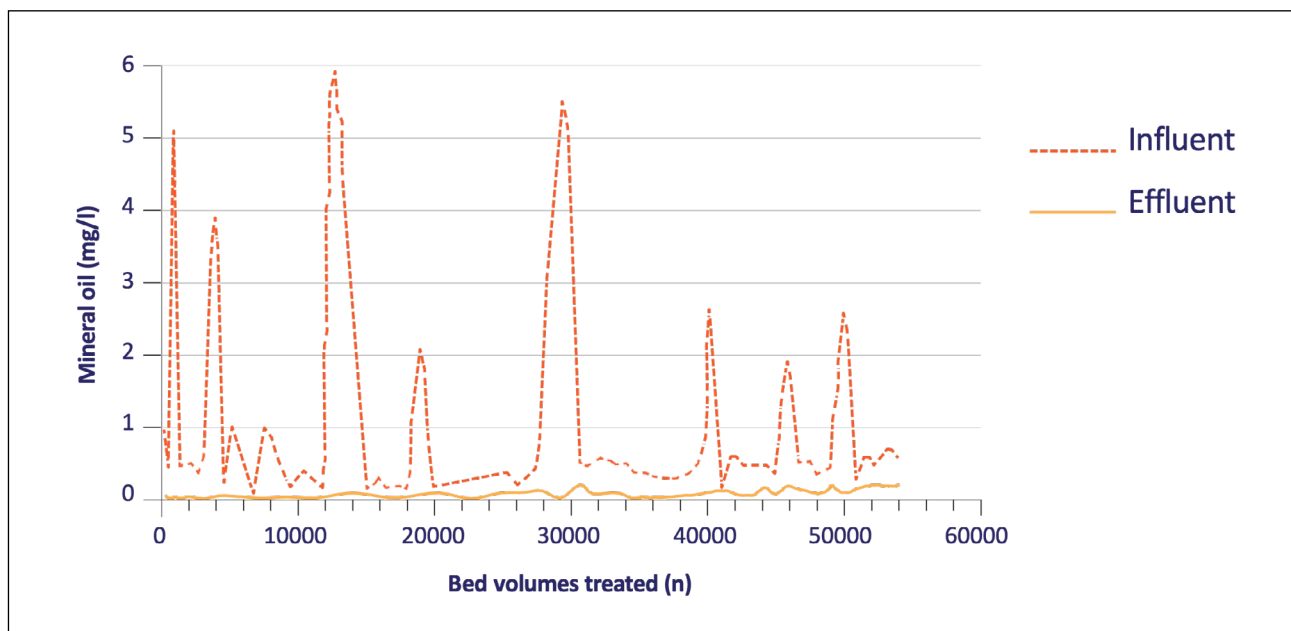
### Analytics<sup>1</sup> & Features

- **Iodine number  $\geq 1000$ :** High capacity for small molecules (Well developed microporosity)
- **HHA number  $\sim 5$ :** Small capacity for large molecules (Limited mesoporosity)

### Comparative Benefits

- Removes small sized organic contaminants (light oil fractions, light lubricant oils, etc).
- When only such small sized foulants are present:
  - Good protection of downstream resins and boiler
  - Good service life expectancy

## NORIT ROY 0.8 Extruded Activated Carbon: Organics Removal<sup>2</sup>



[1] Iodine Number: ASTM capacity indicator for small molecules; HHA Number: Heavy Hydrocarbon Adsorption Number; capacity indicator for larger molecules.

[2] VGB PowerTech Journal 5/2006, p 106-9. Case study with a predecessor of current ROY.

# Product Performance: Silica Leaching

## NORIT ROY 0.8

### Performance

- Lowest Si leaching
- Lowest startup water volume<sup>4</sup>

### Comparative Benefits

- Best boiler performance/heat transfer (lowest silica deposits)
- Lowest burden on ion exchange/regeneration costs
- Lowest startup water demand/costs

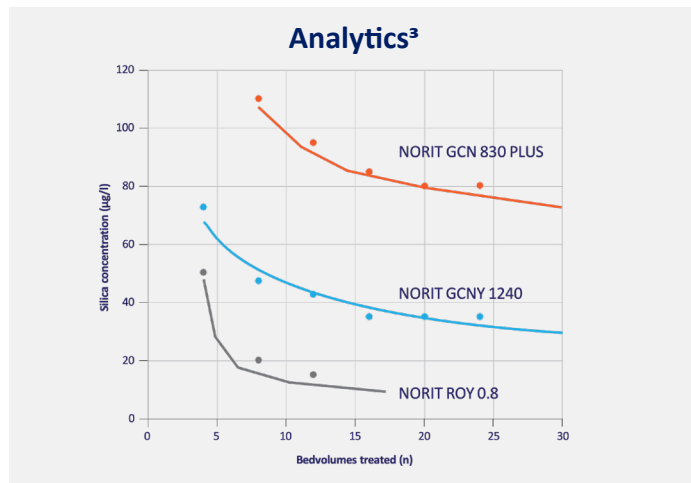
## NORIT GCNY 1240

### Performance

- Very low Si leaching
- Very low startup water volume<sup>4</sup>

### Comparative Benefits

- Very good boiler performance /heat transfer (very low silica deposits)
- Very low burden on ion exchange/regeneration costs
- Very low startup water demand/costs



## NORIT GCN 830 PLUS, NORIT GCN 1240 PLUS

### Performance

- Very low Si leaching
- Very low startup water volume<sup>4</sup>

### Comparative Benefits

- Good boiler performance/heat transfer (low silica deposits)
- Low burden on ion exchange/regeneration costs
- Low startup water demand/costs

# General Product Characteristics

## NORIT® Activated Carbon Grade: NORIT ROY 0.8

### Performance & Comparative Benefits

- **Wood based<sup>5</sup>:** Produced with low CO2 footprint
- **Extruded activated carbon — engineered particle shape ('rods')**: Low pressure drop
- **High hardness, smooth particles, very low abrasion:** Very low fines formation, long lifetime Spent carbon is suitable for reactivation<sup>6</sup>

## NORIT® Activated Carbon Grade: NORIT GCNY 1240, NORIT GCN 830 PLUS, NORIT GCN 1240 PLUS

### Performance & Comparative Benefits

- **Coconut shell based:** Produced with low CO2 footprint
- **Granular activated carbon:** Pressure drop can be tailored by mesh size (12x40/8x30)
- **High hardness, low abrasion:** Low fines formation, long lifetime
- Spent carbon is suitable for reactivation<sup>6</sup>

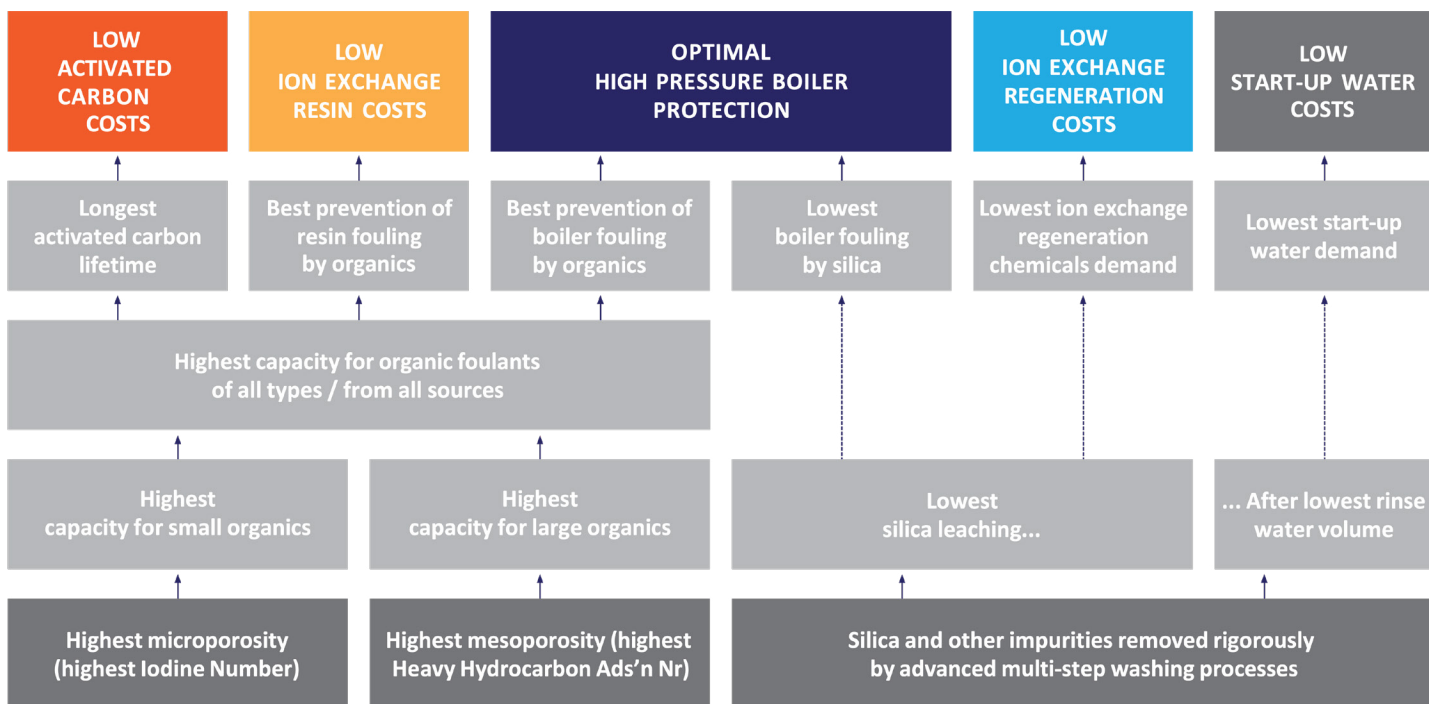
[3] Standard test conditions: pH 8.5, Empty bed contact time 15 minutes, Temperature 38 oC.

[4] Startup water volume needed to reach a low Si leaching target.

[5] NORIT ROY 0.8 extruded activated carbon is a 'second generation' product, made from high purity wood charcoal. It has fully replaced the 'first generation' NORIT ROY (that was made from peat) from 2007.

[6] Reactivation prevents waste. Reactivated product can be deployed in other applications – or even in the original condensate polishing application. After reactivation, an optional additional step of re-washing can be applied to regain high purity. Please contact us for further details.

# NORIT ROY 0.8 Extruded Activated Carbon Offers



## NORIT® Activated Carbon Purification for Living

Building on our greater than 100-year history of innovation in manufacturing and product development, NORIT Activated Carbon is the world's most experienced and one of the largest producers of activated carbon.

Our products are used to remove pollutants, contaminants and/or other impurities from water, air, food and beverages, pharmaceutical products, and other liquids and gases in an efficient and cost-effective manner.

In addition to our unparalleled product portfolio, we offer a full range of activated carbon services including rental systems, carbon reactivation, bulk delivery and change-out, some types of carbon evaluation, as well as technical service and support to help our customers meet their specific purification needs.

We provide our customers with a worldwide network of sales and service support. In fact, we manufacture activated carbon and reactivate carbon in multiple plants around the world. So whether you have one operation or many facilities around the globe, we have you covered.

**Helping our customers meet their specific purification needs**

# NORIT

## ACTIVATED CARBON



**Our sales, technical service, and customer service teams are well prepared to serve customers around the world.**

[www.norit.com](http://www.norit.com)



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Condensate Treatment 05/2024