



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.

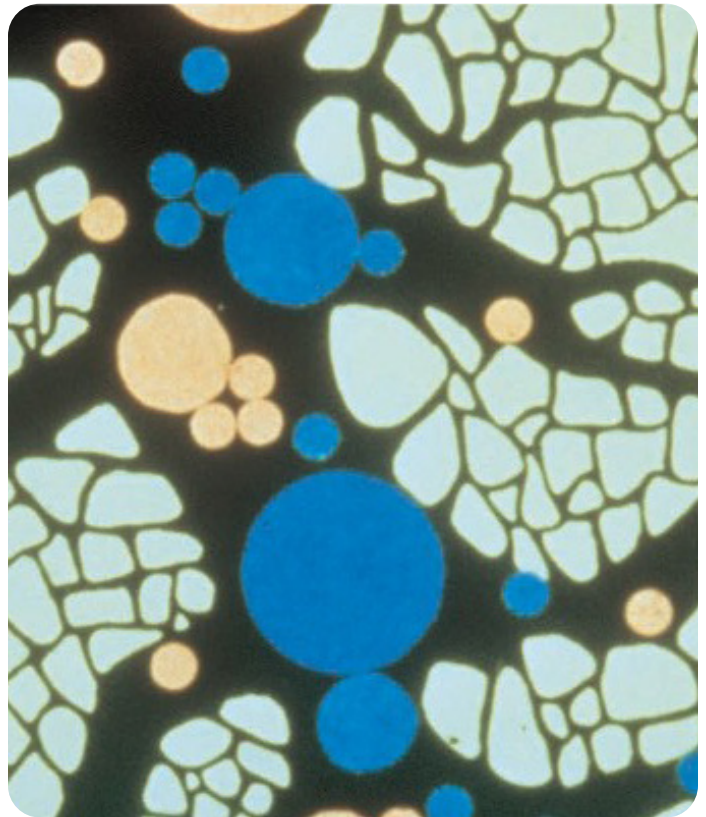
2. Key Activated Carbon Performance Criteria

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

Product Performance: Organic Foulant Removal

NORIT ROY 0.8

Analytcs¹ & Features

- **Iodine Number ≥ 1200 :** Very high capacity for small molecules (Highly developed microporosity)
- **HHA Number ≥ 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

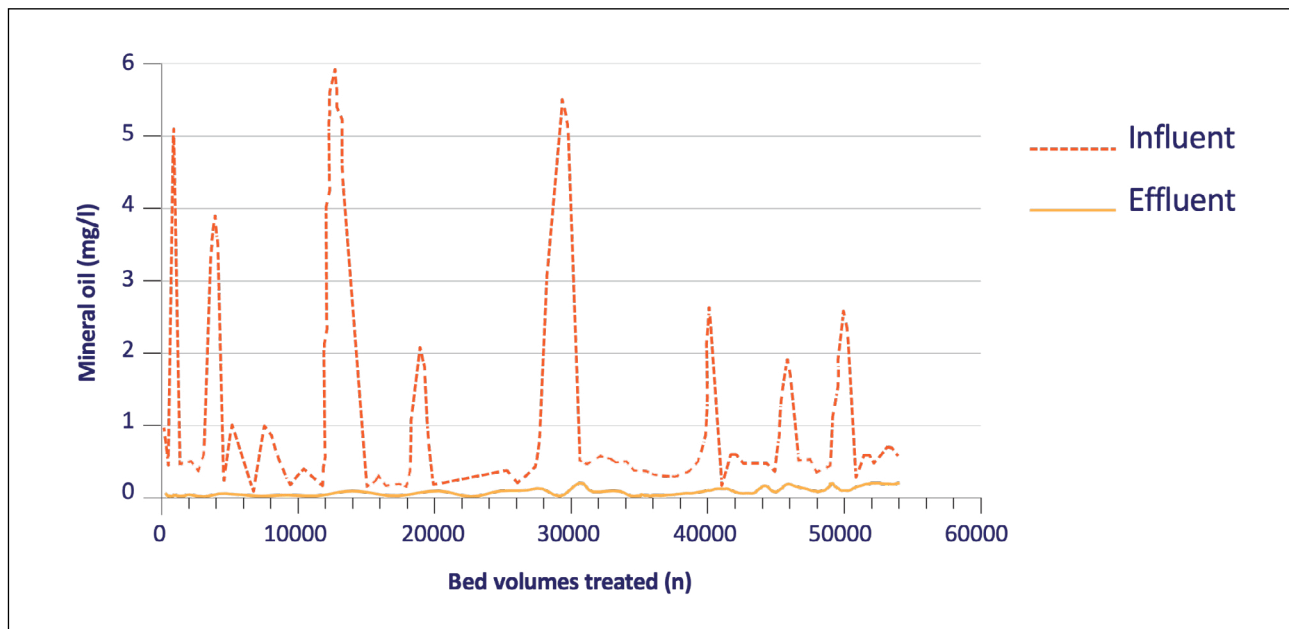
Analytcs¹ & Features

- **Iodine Number ≥ 1000 :** High capacity for small molecules (Well developed microporosity)
- **HHA Number ~ 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 Removal²



[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 volume⁴

Comparative Benefits

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

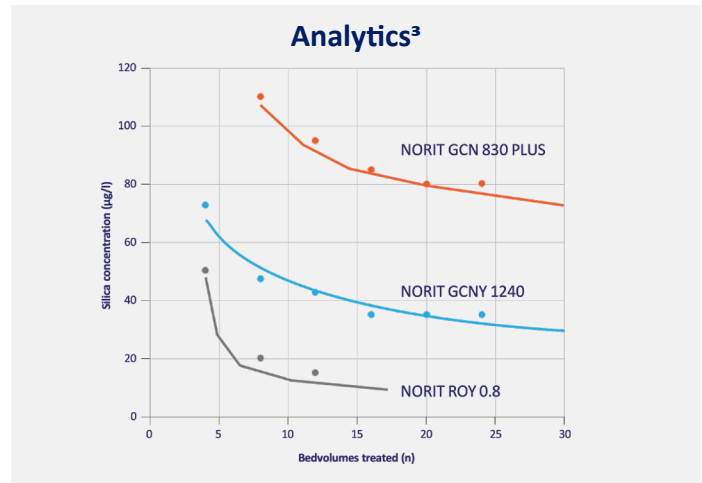
NORIT GCNY 1240

Performance

- Very low Si leaching
- Very low startup water volume⁴

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 volume⁴

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-Based⁵:** 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 reactivation⁶

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 reactivation⁶

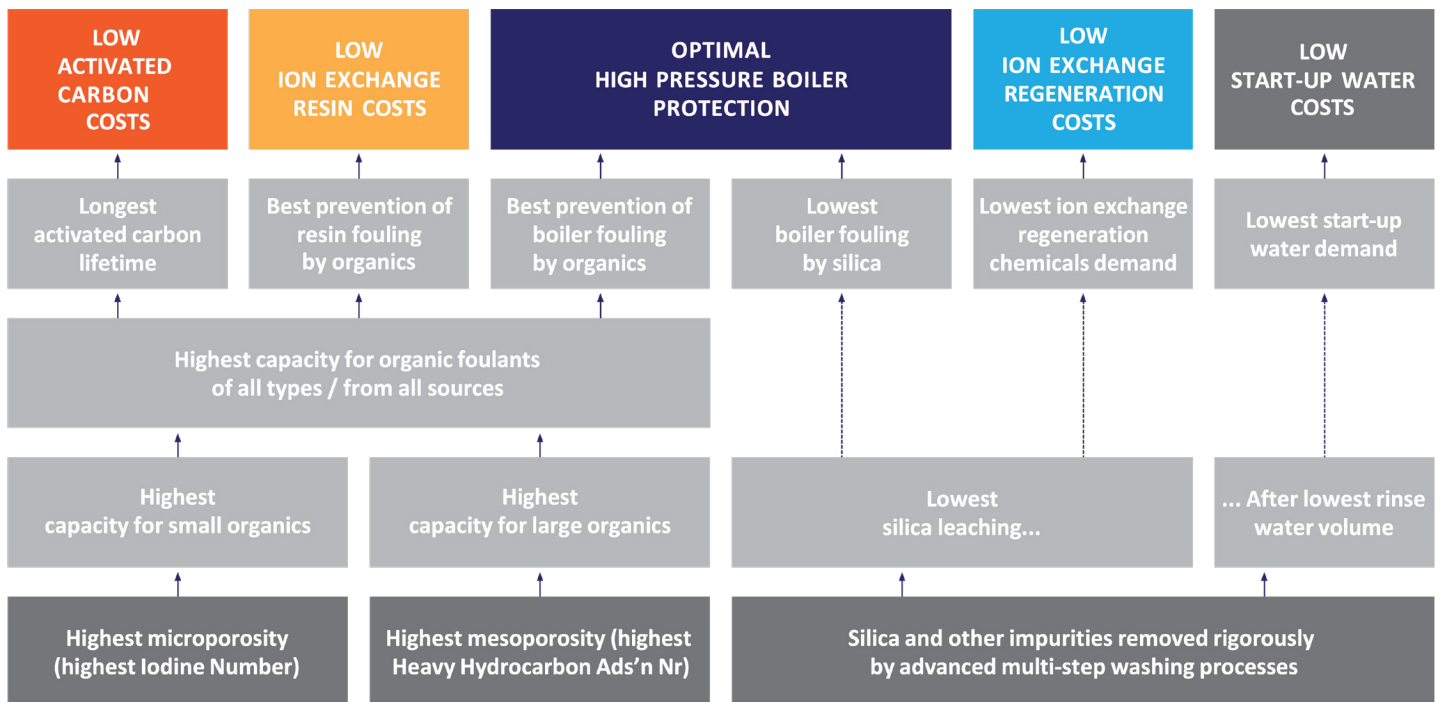
[3] Standard test conditions: pH 8.5, empty bed contact time 15 minutes, temperature 38°C.

[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 changeout, 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.

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