

NACAR RED

Quality high activity coconut based granular activated carbon chemically impregnated for chemisorption of mercury.

Features

- High activity
- Low attrition
- Low dust

Benefits

Accommodates both physical & chemical sorption
 Minimal carbon fines
 Easy handling and improved safety

Physico-chemical specifications

Apparent density (g/cc)	(ASTM D2854)	0.40-0.50
Moisture as packed (% max)	(ASTM D2867)	5
CCl ₄ adsorption (% min) - Base Carbon	(ASTM D5742)	60
Hardness No., ball pan test (min) - Base Carbon	(ASTM D3802)	92

Properties

Typical loading of Hg (% W/W)

8

Available particle sizes (ASTM D2862)

ASTM mesh size	On larger screen (% max)	Between screen sizes (% min)	Through smaller screen (% max)
4x8	5	90	5
6x12	5	90	5

This product can be tailored according to specific requests.

Packaging

NACAR RED is supplied in 15 and 67 gallon fiberboard drums. Other packaging is available upon request. Labeling is color coded RED in accordance with our NACAR™ range of impregnated carbons.

E. L. Foust Co., Inc.

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Impregnated Activated Carbon for Removal of Trace Amounts of Mercury in Indoor Air

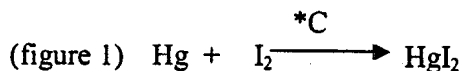
The presence of mercury (Hg) in the environment is considered a tremendous health hazard, due to its toxicity in relatively small amounts. The current OSHA Permissible Exposure Limit (PEL) is 0.1mg/m³; the 8-hour Time Weighted Average (TWA) exposure is 0.05 mg/m³ (vapor), skin, and the NIOSH REL 10-hour Time Weighted Average (TWA) is 0.05 mg/m³ (vapor), skin. To the lay person or average employer who is not an industrial hygienist, what does this mean? Mercury is a liquid at room temperature and has a low vapor pressure, but it can be vaporized and introduced into the air and is a very pervasive poison.

Exposure to mercury, even at low levels which are barely measurable, can be a health hazard. Does your workplace use mercury in any form, have you had a broken mercury-filled thermometer, broken fluorescent bulbs, or is it used nearby, or have you tested for its presence? These can be expensive questions to answer and to resolve, but there is a solution at hand for the concerned employer wishing to protect the work environment for his or her employees.

Chemically impregnated activated carbon, specifically PICA Type Nacar Red (R), is an impregnated coconut shell-based carbon with the capacity to chemically adsorb and fix trace amounts of mercury found in the air.

How does the carbon accomplish this?

Coconut shell-based carbon is widely used in the respirator industry due to its physical hardness (low dust in handling) and its micro-porous nature (a large amount of its pore volume is made of up pores of less than 20 Angstroms in diameter). The combination of these two properties make it well suited for vapor phase applications, and in this case, Indoor Air Quality (IAQ) treatment. But the carbon alone is really not sufficient in capacity or safety for mercury removal, as mercury could "desorb", or re-vaporize, even in minute quantities after being physically adsorbed into the carbon pores. Several different types of chemical impregnants are effective with carbon to enhance its chemical adsorption of mercury, but they can also cause problems with corrosion, handling, etc. With the addition of a chemical impregnant (Iodine) by PICA's methods, the adsorption of mercury in particular is greatly enhanced. The micro-porous carbon readily adsorbs contaminants out of the air that is passed through a carbon bed, into the high potential-energy micropores. The presence of iodine and the catalytic effects of activated carbon (*C) enhance the "chemisorption", or chemical adsorption of mercury, by causing a reaction between iodine and mercury as follows:

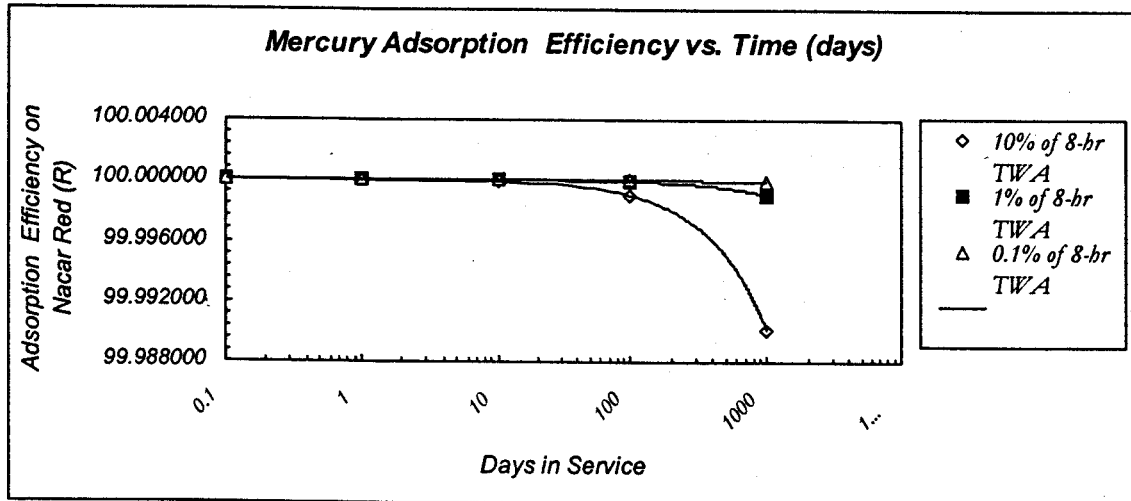


The product of the chemisorption reaction, mercury(II) iodide (melting point 259°C.), is a stable, virtually water-insoluble solid, now residing in the pores of the carbon, and will not spontaneously desorb from the micropores back into the treated room air. This will irreversibly remove traces of elemental mercury in Indoor Air and concentrate them on the carbon. Care must then be taken in ultimately disposing of this carbon which now has chemisorbed mercury, but the user will have safely removed this cumulative poison from the work environment air.

How long will the carbon last?

The carbon, PICA Type Nacar R has sufficient amount of Iodine (+6%w/w) on it to chemisorb a rather significant amount of mercury, weight-for weight, at better than 99% efficiency level, under ideal conditions. But most conditions are less than "ideal", in the sense that relative humidity could be more than 30-40%, leading to significant moisture adsorbed on the carbon, and the carbon will also adsorb other chemicals and odors out of the air. With the moisture and other factors diminishing the pore volume and availability of the carbon for mercury chemisorption, we recommend a change out annually or biannually, to guarantee the continued +99% mercury chemisorption efficiency.

(figure 2)



The above chart was derived in the following way: An assumption was made of treating 50 cubic ft. per minute of air (or 1.416 m³/minute), with the mercury concentration ranging from one-tenth to one-one-thousandth of the 8-hour TWA average of .05mg/m³. Further, with a 6% impregnant level of Iodine, and a resultant chemisorption capacity of 4.74% w/w mercury, it was assumed that the carbon would maintain up to a +99.0% adsorption capacity up to a 50% loading of mercury. The graph then simply illustrates the expected days of service of a 20 lb. carbon charge of PICA Nacar Red under such conditions. Of course as mentioned above, adsorption of water and other contaminants will cause the carbon bed life to diminish somewhat, and the above is based on 24 hour a day, 365 days per year operation. Results will vary due to actual operation. Recycling room air in an IAQ setting means that even short contact times with the adsorbent (here carbon), with a low removal rate per pass through the filter result in high removal capacity with repeated passes, to maintain a high indoor air quality.