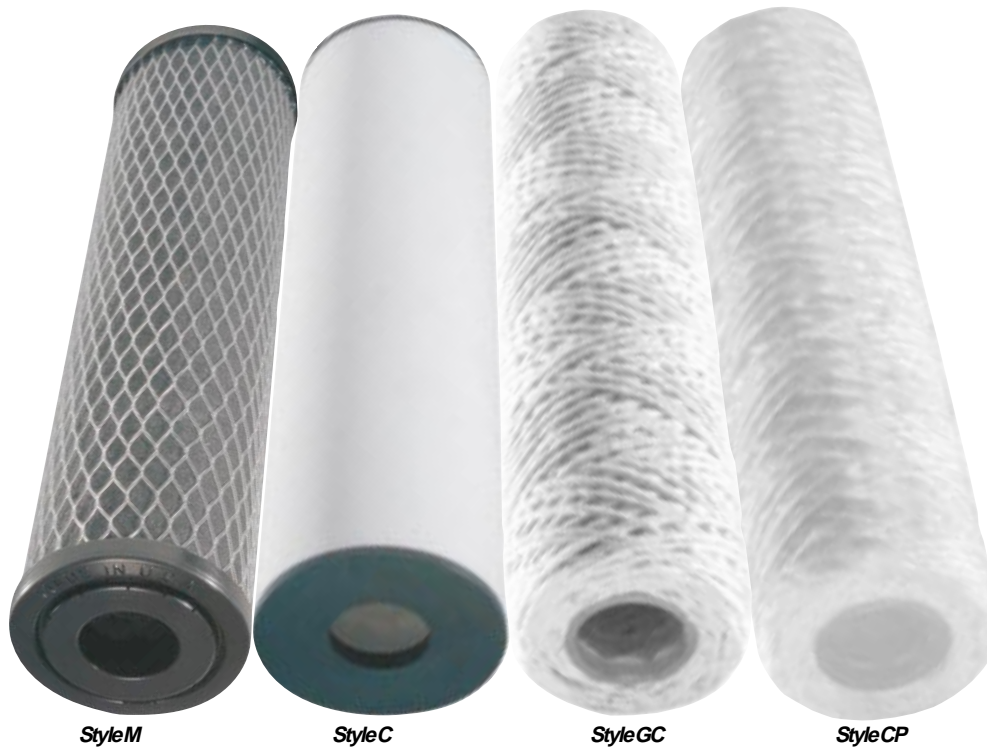


## Penguin Carbon Filter Cartridges



### Features:

- Organic Impurity Removal
- Non-Contaminating
- Choice of Packed Granular or Impregnated Powder Carbon Cartridges
- High Grade Activated Carbon
- Standard Filter Cartridge Replacement

### Recommended Applications:

- Amines, Glycols, Sulfanols
- Water Purification
- Vending Machines
- Photographic
- Dechlorinating
- Plating Solutions
- Oil Removal
- Aromatic Compounds
- High Molecule Weight Alcohols
- Color Removal
- Drinking Water
- Waste Water
- Benzene/Toluene
- PCB's
- Clarity Improvement
- Cooling Tower Treatment
- Beverages
- Decolorizing
- Deodorizing

Penguin carbon cartridges are a one-step carbon and filtration treatment. These cartridges eliminate the problems associated with loose carbon treatment and the need for a separate filtration system. The standard cartridge measures 2 3/4" OD with lengths varying from 4" to 40" and flow rates up to 2 1/2 gpm. These cartridges are designed to be used in either single or multi-tubed vessels.

Penguin carbon cartridges are available in 4 differ-

ent styles. Style GC is an outer wound cartridge which utilizes a special high grade activated granular carbon with a very low sulfur content. Style CP is also an outer wound cartridge which features layers of paper impregnated with activated powdered carbon. Style C is a porous polyethylene shell containing high grade activated granular carbon. Style M features an outer layer of polyolefin webbing with an impregnated carbon powder interior.

# Series PC

## Penguin Carbon Filter Cartridges

**ADSORPTION DEFINITION:** Adsorption may be defined as a process in which fluid molecules are concentrated on a surface by chemical or physical forces, or in both. In physical adsorption, the contaminants are held on the surface of the adsorbent by weak van der Waal and electrostatic forces, whereas in chemical adsorption, these forces are relatively strong and occur at active sites on the surface.

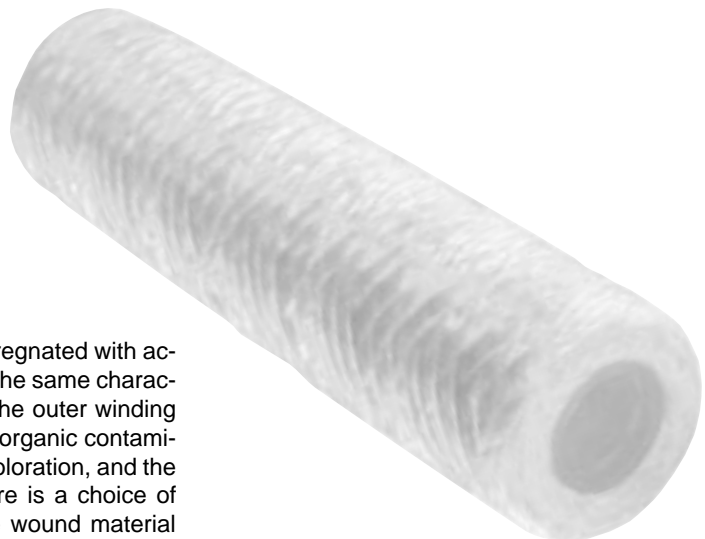
*Potable Water, Food and Beverages  
Removal of Free Chlorine  
Removal of Foul Tastes, Odors, Colors  
Removal of Trace Dissolved Organics  
Sediment Removal  
Purification of Plating and  
Photo Processing Solutions  
Waste Water Treatment  
Process Water Recycling  
Removal of Organic Matter and Color  
Molecules*



### Style GC

This outer wound carbon cartridge removes undesirable tastes, odors, sediments, discoloration, and chemicals from water, hydrocarbon gases, and other industrial fluids. It also provides organic removal from plating, acid, and alkaline solutions. This economical carbon cartridge is actually three filters in one. It first provides filtration through an outer winding, then through a layer of activated granular carbon, and finally through a 5 micron polishing inner winding. Choices of core materials and wound materials make Penguin's Style GC cartridges a versatile and economical choice for all carbon filtration needs.

*Potable Water, Food and Beverages  
Removal of Free Chlorine  
Removal of Foul Tastes, Odors, Colors  
Removal of Trace Dissolved Organics  
Sediment Removal  
Photo Processing Solutions  
Graphic Arts  
Plating Solution Clarification*



### Style CP

This outer wound carbon cartridge features layers of paper impregnated with activated powdered carbon with a very low sulfur content. Having the same characteristics as the Style GC, it also provides three filters in one. The outer winding acts as a pre-filter, the carbon impregnated paper removes the organic contaminants as well as undesirable tastes, odors, sediments, and discoloration, and the 5 micron polishing inner winding completes the process. There is a choice of polypropylene, FDA polypropylene, or bleached cotton for the wound material with the core material being either polypropylene or stainless steel.

# Series PC

## Penguin Carbon Filter Cartridges

*Purification of Potable Water, Beverage Water, Water for Kidney Dialysis and Aquarium Water.*  
*Removal of Free Chlorine*  
*Removal of Foul Tastes, Odors, Colors*  
*Volatile Organic Chemical Removal (VOC's)*  
*Sediment Removal*  
*Purification of Plating and Photo Processing Solutions*  
*Waste Water Treatment*  
*Process Water Recycling*  
*Remediation of Contaminated Groundwater*  
*Recover of Gold                      Sulfur Dioxide*  
*Hydrocarbon Vapors                Hydrogen Sulfide*



### Style C

The porous shell carbon cartridge has been designed primarily for use in removing organics and particulate contaminants from plating, acid, alkaline, and hydrocarbon solutions. The pre-filtering outer shell is a strong non-corroding polyethylene with ethylene-propylene end caps. There are 9 oz. of activated granular coconut carbon per 10" length, providing an extended life of up to 50% over the cartridges. The liquid flows from the outside of the cartridge through the carbon granules, removing organics, and finally through a 3 micron inner wound layer of polypropylene media for a polishing depth filtration.

For gases, this carbon cartridge can be used in removing organics such as oil mist, water vapor, fine dust, and scale particles. The polyethylene outer wrap possesses excellent filtering/coalescing properties. Most of the oil/water contaminant will be trapped and collected in the shell. The activated carbon is very effective for adsorption of very finely dispersed oil, smoke, odors, and aqueous mist that might penetrate the outer wrap. The inner wound layers then provide an excellent air polishing media.

*Purification of Potable Water*  
*Removal of Free Chlorine*  
*Removal of Foul Tastes, Odors, Colors*  
*Sediment Removal*  
*Purification of Plating and Photo Processing Solutions*  
*Decolorizing                      Deodorizing*



### Style M

This impregnated carbon cartridge is constructed with an outer layer of polyolefin and synthetic fibers which removes solid particles and protects the inner carbon powder layer from premature clogging. The sulfur-free carbon powders form a fixed bed which provide increased carbon treatment capacity. The polypropylene core is surrounded by fine microfibers which again filters the solution and assures no carbon bleed-off. Economical cartridges are available when cellulose-free cartridges are not required.

# Series PC

## Penguin Carbon Filter Cartridges

**Introduction:** Carbon belongs to a family of elements, which in their highest state of oxidation, are tetravalent; the other members of the family are silicon, germanium, tin, and lead. Carbon and silicon are non-metallic elements, while the others are metals. Carbon occurs in nature in two distinct allotropic crystalline modifications, which are known as diamond and graphite. Coconut shell carbons have very large surfaces per unit weight, owing to the fineness of the pores of the materials from which they were made. The higher the molecular weight and boiling point of the gas or liquid and the lower the temperature, the greater the adsorption. Charcoal is a catalyst for many reactions, particularly between gases when cooled to the temperature of liquid air. Coconut shell charcoal will adsorb very completely all gases except hydrogen, helium, and neon. High density contributes to the structural strength of the carbon so that it can withstand excessive particle abrasion during use.

### Carbon Cartridge Selection and Sizing

- A. Several factors affecting life and efficiency are:
1. Particulate load in fluid
  2. Type and amount of contaminant to be adsorbed
  3. Flow rate, temperature, and pH of fluid
  4. Single pass or recirculation system
  5. Contact time with carbon. Steady or intermittent use.
- Activated carbon is used to purify, deodorize, decolorize, and up grade quality of liquids.
- B. Early in the system, it removes contaminants or it is used as a final step to improve product quality. Activated carbon prefers chemicals with low solubility, low polarity, and a low degree of ionization.
- C. Single pass applications should employ molded activated powder, impregnated carbon, or paper impregnated activated powder carbon cartridges.
- D. Recirculating systems should employ granular carbon cartridges.
- E. Series filtration, utilizing a string wound particulate filter upstream of the carbon cartridge, will increase the life of the carbon cartridge immensely.

F. Sizing is based on contact time. Longer contact time will result in higher adsorption.

G. Higher than recommended flow rates can be employed, but removal efficiency may be sacrificed. The lower the gpm flow rate, the greater the efficiency of the carbon cartridge. We recommend a maximum of 1.0 gpm per 10" cartridge length.

H. Carbon treatment usually begins to be cost effective when adsorbable organic levels are below 20 ppm. With sufficient contact time, GAC can effectively remove contaminants to below detectable levels.

### Packaging

Length	Number of Cartridges per case			
	Style C	Style GC	Style CP	Style M
4 "	NA	30	30	NA
6 "	NA	30	30	NA
9 3/4"	20	20	20	20
10 "	20	20	20	20
20 "	8	10	10	12
30 "	8	10	10	12
40 "	NA	10	10	NA

### Dimensions

PC	GC	10	P	P
Penguin Carbon Cartridge	Carbon Style	Length	Core Material	Fiber Material/Shell
	GC = granular carbon/ outer wound	4 = 4" 6 = 6"	P = polypropylene S = 304SS	P = porous polyethylene or standard polypropylene outer wound PX = fibrillated FDA outer wound PFDA = polypropylene FDA outer wound C = bleached cotton FDA outer wound
	CP = carbon paper/ outer wound	93 = 9 3/4" 97 = 9 7/8"		
	C = granular carbon/ porous shell	10 = 10" 20 = 20"		
	M = impregnated carbon/ outer wound	30 = 30" 40 = 40"		

Not all combinations available. Consult factory.

A Division of Penguin Pumps Inc.  
7932 Ajay Drive, Sun Valley, CA 91352 • 818/504-2391 • 818/768-7590 FAX

