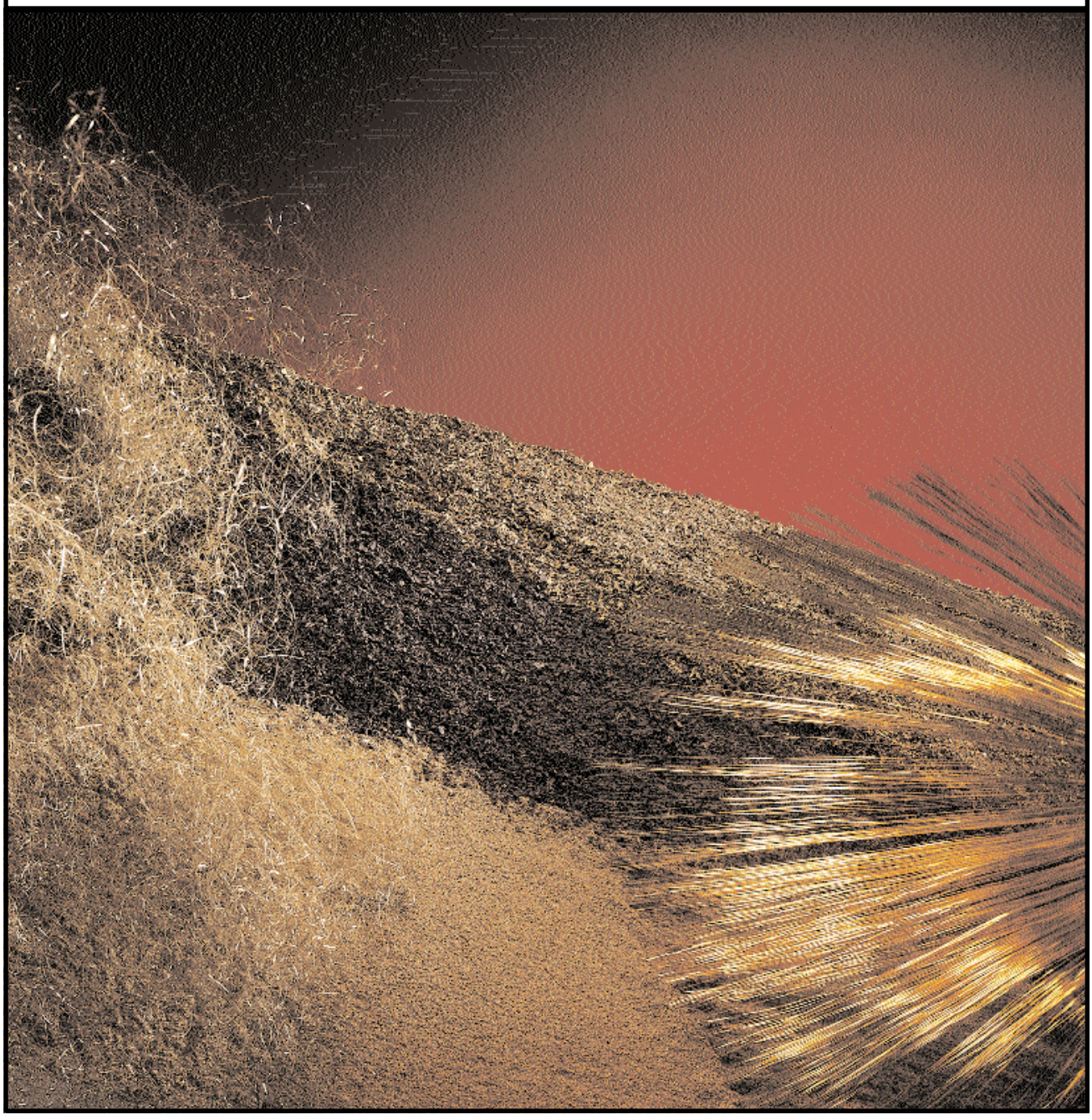
KDF Process Media

Improve the performance and economy of your water purification system.



KDF® FLUID TREATMENT, INC.
Solutions for economical clean water™

KDF process media

As good as existing water treatment technologies are, most have limitations. They're short-lived, or expensive, or difficult to maintain, or easily fouled by microorganisms, or just plain unable to perform up to anticipated stricter regulations.

KDF process media, however, improve water treatment performance by protecting, and in some cases replacing, existing filtration/purification technologies. The exceptional filtration/purification performance and versatility of KDF media make them an economical and easy-to-use water treatment technology in both new systems and retrofit applications.

Manufacturers, hospitals, beverage manufacturers, restaurants, municipal water treatment facilities, consumers, and others rely on KDF process media to safely reduce or remove chlorine, hydrogen sulfide, heavy metals, and bacteria from water.

Improve your system's economy while improving performance

When used alone, KDF media can remove more than 95% of chlorine, iron, heavy metals, hydrogen sulfide, and other contaminants from water.

When used in combination with Granular Activated Carbon (GAC), KDF media can significantly extend the life of the carbon.

Used ahead of reverse osmosis and ion exchange systems, KDF process media also safeguard expensive membranes, resins and system components.

Compared to other water treatment technologies, KDF process media offer reduced material requirements resulting in more compact and more economical systems. KDF process media also last longer than GAC, which means material replacement requirements are lower.

A medical testing laboratory in Dubuque, Iowa uses 2/3 cubic feet of KDF medium to remove chlorine from 3,000 gallons of municipal water daily. It protects downstream RO membranes.

Because KDF process media contain no chemical additives and are 100% recyclable, costly disposal requirements are eliminated. What's more, KDF process media are safer for the environment.

All forms of KDF media are guaranteed for product purity and a certified analysis sheet is provided with each manufacturing run.

About KDF Fluid Treatment, Inc.

Founded in 1984 in Three Rivers, Michigan, KDF Fluid Treatment is a technological leader in the fluid treatment industry. KDF has obtained 11 patents, with other U.S. and foreign patents pending. KDF process media have earned NSF certification (ANSI/NSF Standard 61 for drinking water system components–health effects and Standard 42). Furthermore, KDF Fluid Treatment's process media have been ruled by the U.S. EPA as a "Pesticidal Device."

KDF Fluid Treatment offers superior customer service through an extensive distributor network. With distributors across North America, South America, Europe, and in Japan and China, KDF process media can meet your water filtration/purification needs globally.

Improve water treatment performance and reduce expense

KDF process media are available in several different forms to meet the requirements of specific applications.

- **KDF 55 granules** are designed for removing or reducing chlorine and water-soluble heavy metals. They are also used for controlling scale, bacteria, and algae.
- **KDF 85 granules** are used to remove or reduce iron and hydrogen sulfide from water supplies.
- **KDF-F fine mesh granules** are designed to remove chlorine and can be incorporated into carbon blocks and other matrixes.
- **KDF-C coarse mesh granules** are used for removal or reduction of water-soluble heavy metals and chlorine.

KDF 55 Fine Medium

KDF 55 Medium

KDF 85 Medium

A Los Angeles-based maker of fashion jeans uses KDF media instead of chemicals to remove chlorine from municipal water in their stone-washing process.

Redox action is the science behind KDF process media

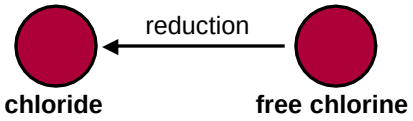
KDF process media are high-purity, copper-zinc formulations that reduce contaminants in water using an oxidation/reduction (redox) reaction.

In other words, KDF media exchange electrons with contaminants, changing them into harmless components. For example, chlorine is changed into water-soluble chloride, soluble ferrous cations are changed into insoluble ferric hydroxide, and hydrogen sulfide is changed into insoluble copper sulfide. Insoluble reaction by-products are easily removed by periodic backwashing.

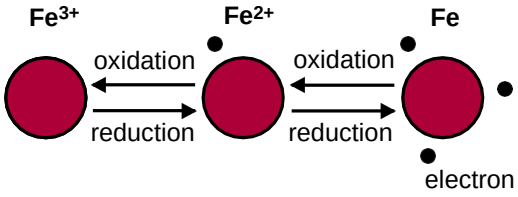
Other heavy metals such as mercury, copper, and nickel are removed simply by bonding to the KDF media.

Microorganisms, however, are controlled two ways: First, the exchange of electrons in the redox reaction creates an electrolytic field that most microorganisms can't survive. Second, KDF process media can cause hydroxyl radicals and peroxides to form from some water molecules. The hydroxide radicals and peroxides interfere with microorganisms' ability to function.

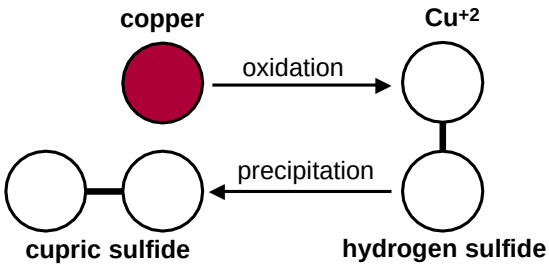
Typical redox reactions



Harmful chlorine is removed by changing free chlorine into chloride ions.



KDF process media act as catalysts to change soluble ferrous cations into insoluble ferric hydroxide, which is easily removed by regular backwashing.



KDF process media reduce hydrogen sulfide to insoluble cupric sulfide, which can be removed by backwashing.

Contaminants removed by KDF process media

KDF process media remove many of the most common impurities found in water supplies.

Chlorine Removal

KDF 55 medium can remove up to 99% of free chlorine. This frees up granular activated carbon for more effective removal of organic contaminants, which affect water quality and foul downstream ion exchange resins and membranes.

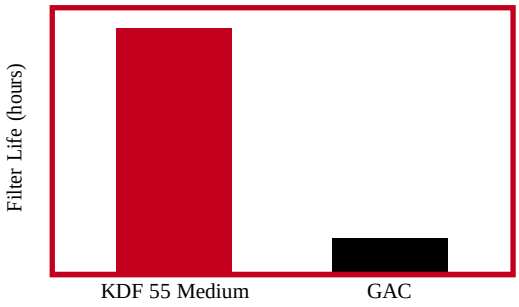
KDF 55 medium can also be used to replace GAC entirely. Because KDF 55 medium provides more efficient chlorine removal, you'll benefit from a more cost effective water treatment system. Chlorine removal costs can be reduced 50% or more with KDF 55 medium.

Household water treatment

Both point-of-entry and point-of-use applications use KDF media to remove chlorine, lead, bacteria, iron, other heavy metals, and a variety of other impurities. For whole-house water systems, KDF media remove chlorine and other impurities from the water supply at the point-of-entry.

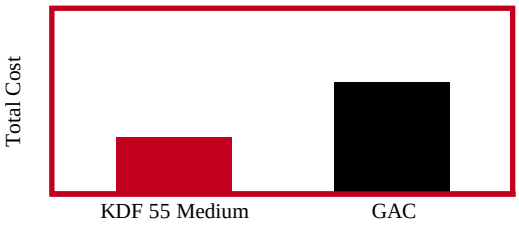
For chlorine removal in point-of-use applications, KDF media is incorporated into shower heads and into cartridges at the tap. KDF media are also used in water treatment systems in recreational vehicles.

KDF 55 medium delivers 10 times greater filter life than GAC



In a controlled test under normal operating conditions, KDF process media delivered a filter life 10 times longer than GAC in chlorine removal service.

Water treatment costs with KDF 55 medium are less than half that of GAC



In the same test, after treating two million gallons of water, chlorine removal cost is 50% lower with KDF process media.

A Kalamazoo, Michigan producer of bottled drinking water uses KDF media as a non-chemical method of removing chlorine and sequestered iron from 7,500 gallons of municipal water daily, extending the operating life of downstream RO membranes by as much as 10 years.

Iron Removal

Iron (Fe^{+2}) or ferrous iron in groundwater can impart objectionable taste and color to potable water and can severely stain household fixtures. KDF process media remove iron from water, either alone or in combination with other treatment technologies used at the point-of-entry.

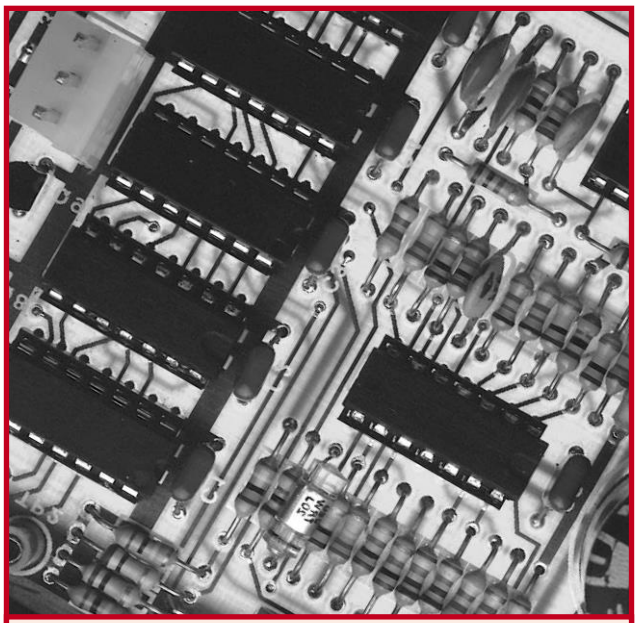
KDF 85 medium removes more than 90% of iron from groundwater supplies. What's more, compared to the alternatives, KDF 85 medium cost less, with higher flow rates and reduced medium requirements, as shown in the table below.

Hydrogen sulfide removal

Hydrogen sulfide (H_2S) is a highly corrosive gas formed in groundwater when bacteria decompose vegetation and other organic matter. H_2S removal with KDF process media is both safe and economical.

KDF 85 medium eliminates H_2S by reducing the hydrogen sulfide gas to cupric sulfide, an inert, harmless precipitant. KDF medium then filters the precipitant from the water. Periodic backwashing eliminates accumulations of the precipitant from the media bed.

In contrast, aeration towers and degasification systems are expensive H_2S removal options. Using chlorine to oxidize H_2S can leave trihalomethane levels exceeding U.S. Environmental Protection Agency (EPA) limits.



In a printed circuit board manufacturing process KDF media removed lead from rinse water. Previously, the company spent $3.12 per gallon to treat lead-contaminated rinse water that was considered a hazardous waste.

One-third as much KDF 85 medium provides three times the effective flow rate of other filter media in iron removal service.

	KDF Media	Oxidation/ Filtration	Oxidizing Filters	Ion Exchange
Flow Rate	15 gpm/sq.ft.	5 gpm/sq.ft.	5 gpm/sq.ft.	20-30 gpm/sq.ft.
Amount of Medium Required for Residential Application	1/3 cu.ft.	1 cu.ft.	1cu.ft.	1cu.ft.

Heavy metals removal

Heavy metals in drinking water are a significant health threat. KDF 55, KDF 85 and KDF-C media can remove up to 98% of water-soluble lead, mercury, nickel, chromium, and other dissolved metals. KDF media can be used alone, or to protect existing water purification technologies to treat groundwater supplies containing water-soluble heavy metals or to remove heavy metals from process water before it is discharged.

Controlling microorganisms

KDF media control the build-up of bacteria, algae and fungi in GAC beds, carbon block filters, and in-line carbon filters.

By eliminating these microorganisms, KDF media significantly extend the life of the carbon, as well as protect downstream RO membranes and ion exchange resins from fouling.

KDF media also control scale, algae, and bacteria in cooling tower water and swamp coolers.

Using KDF media to reduce the build-up of bacteria and other microorganisms eliminates the need for chemical treatment methods which are both costly and harmful to the environment.

Municipal water treatment

Many municipalities rely on the exceptional performance of KDF media to remove chlorine and other impurities from feedwater entering public utilities, schools, and businesses.

KDF media are also cost-effective alternatives to green sand and other filtration methods traditionally used to remove iron from municipal water supplies.

Commercial water treatment

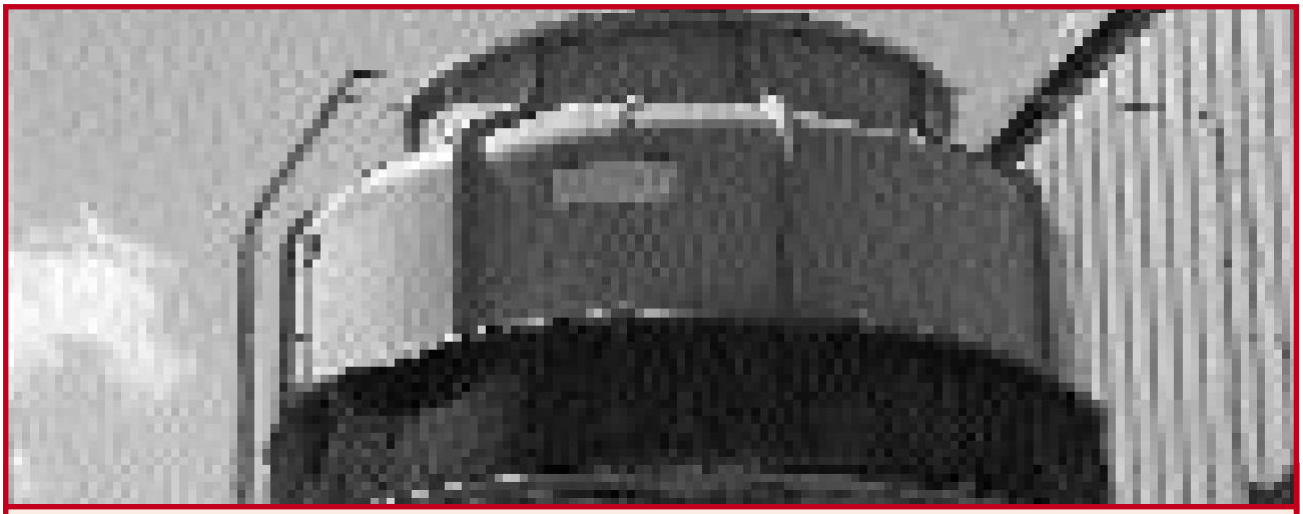
Water treatment systems serving commercial facilities such as hotels and restaurants use KDF process media to remove chlorine. These facilities benefit from better tasting water with less odor, as well as less wear on towels, bedding, napkins and other items that are laundered frequently on-site.

Process water treatment

KDF media remove chlorine and help control bacteria and scale build-up in large-scale industrial water treatment facilities serving cooling towers, food and beverage plants, and industrial laundry facilities. KDF media can be used alone, or in combination with existing water treatment technologies to extend the life of granular activated carbon, and to protect downstream reverse osmosis membranes and ion exchange resins.

Medical water treatment

For medical labs and dialysis centers where water purity is crucial, KDF media provide exceptional water purification. KDF media also remove mercury and other water-soluble heavy metals from feedwater entering hospitals and from wastewater prior to discharge to public water treatment systems.



A plastic injection molding plant uses KDF media to control microorganisms and eliminate scale build-up in cooling towers–at 25% of the cost of chemical treatments.

KDF process media product specifications

KDF 55 Process Medium Specifications
Applications: Chlorine, Heavy Metal Removal and Bacteria.

Medium composition	atomized high purity copper/zinc alloy
Color	golden
Physical form	granular
Screen size (U.S. mesh)	-10 + 100
Particle size range	0.149 mm to 2.00 mm
Apparent density	2.4-2.9 g/cc (171 lbs./cu.ft.)
Turbidity	<20 ntu
Skid	48-1/3 cu. ft. drums (2,736 lbs.)
Odor and tastes	none

Recommended Operating Conditions (use 3-cycle valve):

Service flow	15 gpm/sq. ft.
Backwash for 10 min. @	30 gpm/sq. ft.
Purge/rinse for 3 min. @	maximum
Bed expansion, backwash	10 to 15%
Free board	20%
Minimum bed depth (6" dia.)	10 inches
pH range: drinking water	6.5 to 8.5
Water temperature, influent	35° to 212°F.

KDF 85 Process Medium Specifications
Applications: Iron and Hydrogen Sulfide

Medium composition	atomized high purity copper/zinc alloy
Color	reddish brown
Physical form	granular
Screen size (U.S. mesh)	-10 + 100
Particle size range	0.149 mm to 2.00 mm
Apparent density	2.2-2.7 g/cc (171 lbs./cu. ft.)
Turbidity	<20 ntu
Skid	48-1/3 cu. ft. drums (2,736 lbs.)
Odor and tastes	none

Recommended Operating Conditions (use 3-cycle valve):

Service flow	15 gpm/sq. ft.
Backwash for 10 min. @	30 gpm/sq. ft.
Purge/rinse for 3 min. @	maximum
Bed expansion, backwash	10 to 15%
Free board	20%
Minimum bed depth (6" dia.)	10 inches
pH range: drinking water	6.5 to 8.5
Water temperature, influent	35° to 212°F.

The data included herein are based on outside laboratory tests. We believe the data are reliable, but recommend that users test performance on their own equipment. When using KDF media, proper backwash procedures should be applied.

KDF process media are covered under the following patents:

U.S. patents 4,642,192; 5,122,274; 5,135,654; 5,269,932; 5,198,118; 5,275,737; 5,314,623; 5,415,770; 5,433,856; 5,510,034; 5,599,454; 6,197,204. Foreign counterparts granted. Other U.S. and foreign patents pending.

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