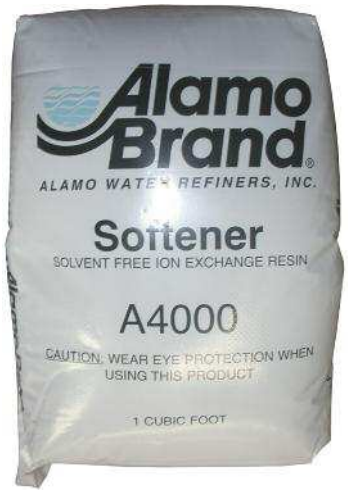
Section 3

Filter Media and Ion-Exchange Resin

Ion Exchange Resin



Alamo Brand A4000 Resin

Alamo brand A4000 resin is a high purity, premium grade, prewashed, strong acid gel-type cation exchange resin specially designed for residential water treatment. A4000 is a bead type, cross-linked, polystyrene divinylbenzene resin that offers excellent bead integrity and very low extractables.

Design conditions

Bed depth	>30 in
Flow rate	2-5 gpm/ft3
Freeboard	50-75%
Backwash expansion	50-75%
NaCl concentration for regeneration	5-25%
NaCl flow rate for regeneration	0.25-0.5 gpm/ft3
Turbidity	<5.0 NTU
Free chlorine	<1 ppm

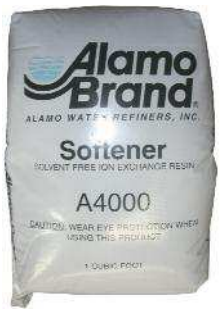
Resin properties

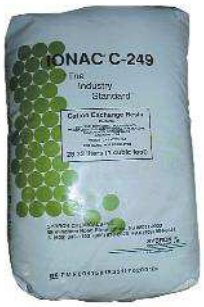
Type	8% crosslink polystyrene
Form	Gel- type, light amber bead
Ionic form	Na+ (as shipped)
Functional group	Sulphonic acid
Bead siz	16 x40 mesh
Effective size	0.45 ± 0.07 mm
Bulk density	53 lb/ft3
Real density	1.28 g/cm3
Bead count	>95%
Water retention	45-48%
Total capacity	>2.0meq/l
Volume change	Na+ - H+ <5%
Stability, temp.	<300°F
Stability pH	0 – 14

Ordering information

Part Number	Description	Application	Ionic Form	lbs. Cu. Ft.	Cu. Ft. Pallet
CATION					
A4000	Alamo Brand 8% crosslink	Softening	NA	52	42
A9009-09	Thermax T-42 8% crosslink	Softening	NA	52	40
A4005	Purolite C-100FM fine mesh	Softening	NA	52	40
A4004	Purolite C-100E	Softening	NA	52	40
A4012	Purolite C-100H	DI	H+	52	40
A4016	Purolite C-100X10 10% crosslink	Softening	NA	52	40
A9000-14	Thermax T-52 10% crosslink	Softening	NA	52	40
A9000-25	Thermax T-42MP 8% macro	Condensate	NA	52	40
ANION					
A4040	Purolite A-400 Type I	DI	CL	43	40
A4044	Purolite A-300 Type II	Alkalinity	CL	43	40
A4064	Purolite A-500P Type I macro	DI/Tannins	CL	43	40
A4073	Purolite A-850 gel acrylic	Tannins	CL	43	40
A9000-35	Thermax A-72MP Type I styrene base	Tannins	CL	43	36
A9000-37	Thermax A-30MP Type I acrylic macro	Tannins	CL	43	36
A9000-36	Thermax A-62MP macro	Nitrates	CL	43	36
A4050	Purolite A-520E macro	Nitrates	CL	43	40
MIXED BED					
A4140	Purolite NRW-37SC Semiconductor 1:1 chem equiv	DI	H+/OH-	43	40
A9000-31	Thermax MB-108P 1:1 volume basis	DI	H+/OH-	43	36

Ion Exchange Media Cross Reference Chart





WATTS	THERMAX		RESINTECH	DOW	MITSUBISHI	PUROLITE	R & H	SYBRON
STRONG ACID CATION								
	T-40	SAC -6.4%		HCR-S(E)S		C-100 E	SR 1L	
A9000-09	T-42	SAC - 8 %	CG8	HCR - S	SK - 1B	C-100	IR -120	C 249
	T-50						IR -130	
A9000-14	T-52	SAC - 10%	CG 10-Na	HGR	SK-110	C-100 x 10	IR - 122	C 250
	T-38				SK-106	C -120E	IR - 100	
A9000-25	T-42 MP	SAC - MP	SACMP	MSC - 1	PK-220	C-150	IR - 200	CFP - 110
	T-56MP				PK-228			
STRONG BASE ANION								
	A - 23	SBA - TYPE I	SBG 1	SBR	SA - 10A	A - 600	IRA - 400	ASB - 1
	A-23 P	SBA TYPE I Porous	SBG 1P	SBR - P	SA - 12A	A - 400	IRA - 402	ASB 1-P
	A-27 MP	SBAMP - TYPE I	SBMP 1	MSA - I	PA - 312	A - 500	IRA - 900	A - 641
	A -32	SBA - TYPE II	SBG 2	SAR	SA - 20A	A - 300	IRA - 410	ASB - 2
	A-36MP	SBA MP TYPE II		MSA - 2	PA - 412	A - 510	IRA - 910	A - 651
	A-21MP	SBA, TYPE-I			PK-312			
	A-21MP(OH)	SBA, TYPE-I			PK-312(LOH)			
WEAK ACID CATION								
	CXO - 12	WAC - GEL	WACG	CCR - 3		C - 105	IRC - 84	CNP
	CXO - 12 MP	WAC - MP	WACMP	MWC - 1	WK - 40	C - 106	IRC - 76	CNP -80
WEAK BASE ANION								
	A -2X MP	WBA - MP	WBMP	DOWEX - 66	WA - 30	A - 100	IRA - 93	AFP - 329
MIXED BED RESINS								
A9000-31	MB - 108 P	MIXED BED						
	MB - 115	MIXED BED	MBD - 15	MR - 3		NRW - 37	IRN - 150	NM - 60
	MB - 112	MIXED BED	MBD - 20			NRW - 38		NM - 72
COLOR AND ORGANIC REMOVAL								
A9000-35	A - 72 MP	SBA MP - TYPE I			PA - 308	A - 500 P	IRA - 904	A - 642
A9000-37	A - 30 MP	SBA MP - TYPE I	SBACR			A-860	IRA - 958	MACRO - T
NITRATE REMOVAL								
A9000-36	A - 62 MP	NITRATE SELECTIVE	SIR - 100			A - 520 E	IRA - 996	SR - 6
CHELATING RESINS								
	CH -90	IMONIDIACETATE	SIR -300	XFS - 4196	CR - 11	S - 930	IRC - 718	
	CH - 93	AMINOPHOSPHONIC	SIR - 500		CR - 20	S-940/950	DUOLITE - 467	
	CH - 95	ISO THIOURONIUM	SIR - 400	A - 1		S - 920		SR - 3
	CH - 99	BORON SELECTIVE			CRB - 02	S - 108	IRA - 743	

Media Loading or Replacement Procedure

Media loading or replacement for water softeners or filters is sometimes required for units in the field. Replacement of media is relatively simple, if the following procedure isfollowed:

Replacement of Media Simplex Unit
Open bypass valve andclose inlet/outlet isolation valves. Duplex Unit - Close inlet/outlet isolation valve of unit to be rebedded. Manually turn timer dial to backwash position (Manual Regeneration) to relieve vessel pressure. Unplug electrical connection of unit. Disconnect inlet, outlet, drain, and brine lines. Unscrew valve head from tank. Remove distribution tube from tank and visually inspect for any damage or wear— replace if necessary. Empty media into a vessel with resin trap/strainer, to retain the resin/gravel and allowing water to drain. Dispose of used media. Relocate softener tank in original location.

Loading of Media
Install distribution tube in mineral tank. Place a cap or tape over the open end of distributor to prevent any media from entering. Fill tank approximately one-third with water to act as a buffer. Slowly pour the required amount of media in each vessel: Gravel to be loaded first. Resin to be loaded second. Clean top of tank and tank threads of any resin or gravel. Removecap or tape from distribution tube and clean. Visually check and clean valve and distribution "O" Ring of any foreign matter and lubricate with silicone or soap.

NOTE: *Do not use Vaseline or grease. Locate control valve on tank making certain riser tube is centered. Tighten valve to tank. Reposition and level tank if necessary to assure proper alignment. Connect inlet, outlet, drain, and brine connections*

MICRO-Z™

Superior filtration media

Alamo's Micro-Z™ granular filter media outperforms conventional multimedia materials due to its unique structure, allowing particulate to penetrate deeply into the filter bed to provide superior filtration at increased flow rates.

Features & benefits

- Higher solids loading capability
- Superior filtration performance
- Reduced backwash frequency
- Removes finer particles
- Reduces pressure drop
- Provides higher flow rates
- Light weight
- Reduces shipping costs
- Easy to handle

Physical properities

Color	Light green
Bulk density	55 lbs. per cu. ft.
Specific gravity	2.2 gm/cc
Mesh size	14x40
Uniform coefficient	1.9
Hardness (Mohs scale)	4

Conditions of operation

Recommended bed depth	36" - 48"
Recommended freeboard	50% of bed depth
Service flow rate	12-20 GPM/sq. ft.
Backwash flow rate	12-16 GPM/sq. ft.
Backwash bed expansion	30-40 percent
Note: Allow bed to soak overnight before initial backwash.	

MICRO-Z vs Conventional Filter Media

Media	Nominal Micron Rating	Loading Capacity
Sand	20	1.0 X
Sand & Anthracite	15	1.4 X
Multimedia	12	1.6 X
Micro-Z	5	2.8 X

Micro-Z loading information

Vessel Diameter (Inches)	Media Quantity A7200 (Cubic Ft.)	Under Bed A7005 (Lbs.)	Service Flow Rate	Backwash Flow Rate (GPM)
9	1	12	5-9	5
10	1.5	15	7-10	7
12	2	25	9-15	10
14	3	40	13-21	15
16	4	55	17-28	20
22	6	100	30-50	32
24	8	200	38-62	40
30	10	300	59-98	60
36	20	500	85-140	85
42	30	700	115-190	110
48	40	900	150-250	150

Ordering information

Part Number	Description	Cubic Foot	Weight (Lbs.)	Package
A7200	Micro-Z	1	55	Bag
A7200-B	Micro-Z	40	2,200	Super Sack

Activated Carbon Media

Granular activated carbon

Activated carbon (AC) is a natural material derived from bituminous coal, lignite, wood, coconut shell etc., activated by steam and other means. Carbon is very popular due to its ability to correct many water quality problems.

Benefits

- Improve taste and remove odors
- Dechlorination of water
- Remove color from water
- Removal of organic substances
- Removal of synthetic organic substances
- Clear water for drinking, bathing and cooking!

Adsorption Influencing Factors

Temperature Most effective 60°F - 80°F.

pH Most organics in water are more soluble at pH lower than 7.0.

Contact time Very important to achieve proper flow rates for any adsorption system to function properly.

Carbon media types

Bituminous Basic coal based granular media

Coconut shell Superior level of hardness; high activity level; trihalomethane removal; longer life expectancy;

Acid washed Increases adsorptive capacity of carbon base and lowers the level of impurities.

Catalytic Specialized carbon media to remove hydrogen sulfide gas and chloramines.

Standard Operating Conditions

Service flow rate	2 - 6 gpm/cu.ft.
Freeboard	20%
pH	6.5 – 7.5

Contaminates adsorbed

- Chlorine
- Organic Chemicals
- Fertilizers
- TCE (Trichloroethylene)
- EDB (Ethylene dibromide)
- THM (Trihalomethanes)
- Sediment
- Chemical odor
- Pesticides
- Detergents
- Chloramines

Note: Service flow rates are calculated at 2-6 gpm/ft^3 for standard taste, odor and chlorine removal application using bituminous carbon. Chloramines and TDS applications will require lower service flow rates and longer empty bed contact time or specialized carbon formulations.

Ordering information

Part Number	Description	Type	Mesh	Cubic Feet Per Bag	Container Wt. (Lbs)	Per Pallet
A9231-JCLF	Jacobi Low fine Aquasorb CS Carbon	Coconut	12 x 40	1	27.5	40
A9230-J	Jacobi acid wash Aquasorb HS Carbon	Coconut	12 x 40	1	27.5	40
A9030A	Acid washed, low fines	Bituminous	12 x 40	1	27.5	40
A9030-C	Calgon F-200 acid washed, low fines	Bituminous	12 x 40	1	31	40
A9231-J	Jacobi Aquasorb CS Carbon	Coconut	12 x 40	1	27.5	40
A9031A	Carbsorb™ 40	Bituminous	12 x 40	1	27.5	40
A9031-C	Calgon F-400 low fines	Bituminous	12 x 40	1	27.5	40
A9032A	Carbsorb™ 30	Bituminous	8 x 30	1	27.5	40
A9232-J	Jacobi Aquasorb CS Carbon	Coconut	8 x 30	1	27.5	40
A9044A	Calgon 20 x 50 mesh media	Bituminous	20 x 50	1	27.5	8
A9231-A	Calgon coconut shell carbon media	Coconut	12 x 40	1	27.5	40

SAFETY MESSAGE: Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate procedures for potentially low-oxygen environment should be followed.

Catalytic® Granular Activated Carbon

Hydrogen sulfide and chloramines removal

Part # A8056

Catalytic carbon is a liquid phase virgin activated carbon that has been manufactured to develop catalytic functionality. The product is unique in that it concentrates reactants via adsorption and then promotes their reaction on the surface of the pores.

Features & benefits

- Catalytic activity allows for smaller more compact system sizing and lower capital requirements.
- No safety concerns with exotherms or toxicity like some impregnated medias.
- Improved trace organic capacity per unit volume.
- High hardness reduces fines and losses do to handling.
- Works with low oxidant levels and limits the need for chemicals.
- Simple and reliable equipment design that can handle spikes in concentration without metering of chemicals.
- Reduced carbon requirements reduce operating costs.
- Enhanced carbon media performance for a greater degree of contaminant removal at reduced costs.
- Thermal reactivation is an option for recycle and reuse to minimize operating costs and eliminates disposal concerns.

Properties

Carbon base	Bituminous
Peroxide No.	14 max
Iodine No.	825 mg/g min
Ash (by weight %)	7 max
Moisture (by weight %)	3 max
Abrasion No.	75 min
Apparent density	0.56 g/ml min
Through 12 mesh %	5 max
Through 40 mesh %	4 max

Applications

- Chloramines
- Hydrogen sulfide
- Taste and odor
- VOC removal
- Iron removal
- Residential water filters
- Commercial water filters
- Bottling and soft drink industries
- Aquarium water treatment

Design considerations

Catalytic carbon is produced from bituminous coal using a patented process for the use in liquid phase systems to promote catalytic reactions. The reactant concentration determines the effective contact time. Although it is not impregnated with metals or alkali, it displays the catalytic functionality of these materials.

Ordering information

Part Number	Description	Type	Mesh	Cubic Feet Per Bag	Container Wt. (Lbs.,)	Per Pallet
A8056	Calgon Centaur® Carbon	Catalytic	12 x 40	1	33	40
A8056-J	Jacobi Cx-MCA Carbon	Catalytic	12x40	1	27.5	40

Safety message: Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low oxygen spaces should be followed, including all applicable federal and state requirements.

Filox-R™

Iron, Hydrogen Sulfide, and Manganese Removal

Filox-R™ media

Filox-R™ media is an economical Iron and Hydrogen Sulfide filtration media that out performs traditional Greensand and Birm.

Features & benefits

- Superior high efficiency media for filtration and removal capabilities
- No oxidizing chemicals needed for regeneration.
- High efficiency with 80% manganese dioxide for enhanced performance and capacity.
- Effective, from 5.0 pH to 9.0 pH
- Highest flow rate of any standard iron removal media.

Operating Conditions

Active Ingredient	75-85% Manganese Dioxide
Service Flow	6 gpm/cu.ft.
Freeboard	30-50%
Backwash rate	12-15 gpm/sq.ft @ 60F
Bed depth	20 inch Minimum
pH Range	5.0 – 9.0
Screen size	12 x 40
Bulk density	114 lbs/cu.ft.
Removal Capacity	
Iron	15.0 ppm
Hydrogen Sulfide	7.0 ppm
Manganese	3.0 ppm

Comparitive information

Product Name	Active Ingredient	Relative life
Birm	< 0.01% Manganese Dioxide	1
Greensand	0.5% Manganese Dioxide	50 X birm
Filox-R™	75% - 85% Manganese Dioxide	7500X birm

Ordering information

Part Number	Description	Cubic foot	Weight (Lbs.)	Package	Pallet Qty
A8033	Filox-R™ media	0.5	57	Bag	37

The use of additional oxidizing agents (oxygen, chlorine, ozone, hydrogen peroxide, potassium permanganate, etc.) is recommended. Oxidizers will not adversely affect Filox-R™. As a matter of fact, they will enhance its performance. They super-oxidize the media, which enables Filox-R™ to perform quicker and keep cleaner. It is always a safe practice to install an oxidation method upstream (in front) of the Filox-R™ bed.

Testing for ORP

Oxidation Reduction Potential (ORP) can be the most important factor to take into consideration in certain waters. Highly reducing waters may cause premature exhaustion or even destruction of the Filox-R™ bed. Precautions can be taken prior to installation that can prevent ORP problems. Use one of the screening tests and follow the instructions below if the subject water has reducing properties that will require additional oxidants.

Simple test

Mix 1.75 ounces (50 grams) water with 0.75 ounces (22 grams) of potassium permanganate crystals.Then take 2 drops of the mixture and stir into a fresh 1/4 gallon (1 liter) sample of the subject water. Let the subject water stand for 15 minutes. If the pink color remains, Filox-R™ can be installed without additional oxidants. If the pink color disappears, additional oxidants will be needed for Filox-R™ to function properly.

ORP meter test

Note: Must use a calibrated ORP meter. Any reading that is above a negative 170 millivolts indicates that Filox-R™ can be used effectively without additional oxidants. Any reading falling below a negative 170 millivolts indicates that additional oxidants will be required.

ScaleNet™ Scale Prevention Media

From an industry name you can trust!

The problem

Calcium creates scale in pipes, on appliances and other plumbing surfaces. This leads to higher heating and energy costs and expensive repairs to appliances, such as ice machines, coffee makers, dishwashers and cooling towers in commercial buildings.

Scale can also be a source for bacteria to grow, which can be a health concern in drinking water applications. Calcium, on the other hand, is important to human health, and supplements are recommended if Calcium is reduced or totally void in one's diet.

The solution

ScaleNet™ prevents Calcium scale formation, as proven in our San Antonio testing facility using side-by-side glass vessels with heating elements (heated to 180°F) to simulate performance of a hot water heating system. Water, with 16-17 grain hardness was treated at specified flow rates. Tests prove ScaleNet media prevents scale formation. And "de-scaling" was observed after only three weeks of treatment. (As seen in the photo at right, below.)

Side-By-Side Test Stand
(To test untreated and treated water.)

Scale Build-Up
(With untreated water.)

No Scale!
(With ScaleNet treated water.)

De-Scaling
(After sending treated water to scaled-up heating element).

How it works

ScaleNet™ media from WATTS® transforms Calcium ions into Calcium crystals, which are stable and cannot attach to pipes, surfaces, hardware or heat exchanger components. The crystals are so small they are easily rinsed away by the water flow.

Benefits to using Watts scale prevention systems

- No scale and costly repairs!
- No brine water or backwash!
- Saves water!
- No salt!
- No brine tank!
- No control valve!
- Easy installation!

Flow rates

For satisfactory results, recommended equipment sizing and flow rates must be followed.

ScaleNet™

Re-bed packs

Part Number	Application	For Tank Size	Ship Wt. (Lbs)
M8408-RES-RB	Residential	8" X 35"	6
M8409-RES-RB	Residential	9" X 35"	8
M8410-RES-RB	Residential	10" X 54"	9
M8412-RES-RB	Residential	12" X 52"	12
M8413-RES-RB	Residential	13" X 54"	14
M8409-COM-RB	Commercial	9" X 35"	10
M8410-COM-RB	Commercial	10" X 54"	12
M8412-COM-RB	Commercial	12" X 52"	17
M8413-COM-RB	Commercial	13" X 54"	20
M8414-COM-RB	Commercial	14" X 65"	23
B8416-COM-RB	Commercial	16" X 65"	80
M8421-COM-RB	Commercial	21" X 62"	150

Note: Sizing and flow rates based on maximum hardness of 25 grains/gallon. Please see scale prevention systems listed in Section 1.

Additional Media Types

Sand

Part Number	Description	Application	Cubic Feet per bag	Container Wt. (Lbs.)	Per Pallet
A7002A	Filter sand 0.45-0.55 mm	Sediment turbidity	0.5	50	56
A7003A	Filter sand 0.6-0.8 mm	Sediment, turbidity	0.5	50	56
A7004A	Filter sand 0.8-1.2 mm	Sediment, turbidity	0.5	50	56

Gravel

Part Number	Description	Application	Cubic Feet per bag	Container Wt. (Lbs.)	Per Pallet
A7005A	Gravel flint #20 1/8"x1/16" red marking	Sediment, bed support	0.5	50	56
A7006A	Gravel 1/4"x1/8" orange marking	Sediment, bed support	0.5	50	56
A7007A	Gravel 1/2"x1/4" black marking	Sediment, bed support	0.5	50	56

Anthracite

Part Number	Description	Application	Cubic Feet per bag	Container Wt. (Lbs.)	Per Pallet
A7051	Anthracite #1.5 (0.85-0.95 mm) blue bags	Sediment, turbidity	1	52	50
A7052	Anthracite #2 (2-4 mm) yellow bags	Sediment, turbidity	1	52	50

Garnet

Part Number	Description	Application	Cubic Feet per bag	Container Wt. (Lbs.)	Per Pallet
A7080-50	Garnet #012 (1.45-1.7 mm)	Sediment, turbidity	0.5	50	80
A7084-50	Garnet #036 (0.5-0.65 mm)	Sediment, turbidity	0.5	50	80
A7085-50	Garnet #030/40 (0.32-0.39 mm)	Sediment, turbidity	0.5	50	80
A7086-50	Garnet #050 (0.24-0.33 mm)	Sediment, turbidity	0.5	50	80

Birm

Part Number	Description	Application	Cubic Feet per bag	Container Wt. (Lbs.)	Per Pallet
A8006	Birm (regular)	Iron, HS reduction	1	44	40

Greensand

Part Number	Description	Application	Cubic Feet per bag	Container Wt. (Lbs.)	Per Pallet
A8041-P	Greensand Plus	Iron, HS reduction	0.5	42	50

Neutralizer

Part Number	Description	Application	Cubic Feet per bag	Container Wt. (Lbs.)	Per Pallet
A8012A	Flomag PWT Magnesium Oxide -similar to Corsex	Neutralizer	0.5	50	60
A8021-50	Calcite	NSF Neutralizer	0.5	50	60

KDF

Part Number	Description	Application	Cubic Feet per bag	Container Wt. (Lbs.)	Per Pallet
KDF55-DRUM	KDF-55	Chlorine reduction	Drum	57	48
KDF85-DRUM	KDF-85	Fe, Chlorine reduction	Drum	57	48

Misc.

Part Number	Description	Application	Cubic Feet per bag	Container Wt. (Lbs.)	Per Pallet
A8014-FL	Filter Lite	Sediment, turbidity	1	25	80