



CATALOGUE OF THE PRODUCTS

FOR WATER TREATMENT IN POWER INDUSTRY



2019



TOKEM

HIGH-TECH PRODUCTION OF ION EXCHANGE RESINS

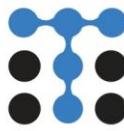
Dear colleagues ad partners,

I am pleased to introduce here the general information on ion exchange resins produced by "TOKEM" Production Association LLC (OOO).



A.L. Tikhomirov

Director General
"TOKEM" Production Association LLC (OOO)



The history of our company dates back to February 3, 1942, when the plant "Karbolit" evacuated from Orekhovo-Zuevo (Moscow region) rearwards to Kuzbass put out its first products. This day is considered the birthday of Kemerovo company "Karbolit". In 1991, in the course of corporatization Kemerovo Research and Production Association "Karbolit" was converted into JSC Company "TOKEM", and since August 2004 we are "TOKEM" Production Association LLC (OOO). Applying the results of our own research and experience, the company "TOKEM" provides commercial supply of ion exchange resins for various applications in accordance with the wishes and requirements of customers.

The most significant of all existing technological problems is, undoubtedly, the problem of water supply and efficient use of water resources for population and industry needs. One can neither live nor can carry out production processes without quality water. Water is a key strategic product, thus technology aimed at obtaining high-quality water is becoming increasingly more important. Ion exchange resins are used not only in water treatment, but also in virtually all industries.

Our company possesses a state-of-the-art technology of production of monodisperse ion exchange resins that allows us to produce and deliver to the market the most effective and demanded materials.

Development and production of ion exchange resins is fully consistent with our forward strategy, namely, to be a leading Russian company in the field of ion exchange.

Products supplied by our company are the outcomes of our own research center providing the implementation of innovation and development of production. Our main goal is to satisfy the requests, wishes, and requirements of customers, which is ensured by a professional team of experienced engineers and researchers.

A.L. Tikhomirov

Honoured Chemist of the Russian Federation
Director General of "TOKEM" Production Association LLC (OOO)



TOKEM

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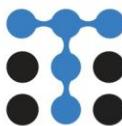
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CATION EXCHANGE RESIN TOKEM-140

TR 2227-016-72285630-2010

Strong acid cation exchange resin (gel type) with uniform particle range composition. It possesses uniformity range of less than 1.1.

High monodispersity and the absence of small fraction contributes to significantly decreased pressure drop across the bed height. These features enable high flow rates enhancing regeneration effectiveness and reducing reagent and rinsing water requirements.

Uniform particle composition, compact bed packing, and no dead zones increase diffusion rate and contact area thus leading to better ion exchange kinetics.

The cation exchange resin is stable to chemical and mechanical stress, it is characterized with a high osmotic stability. It results in doubling service life of the monodispersed resin compared to that of polydispersed cation exchange resins.

GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	Sulfonic acid
Polymer structure	gel
Ionic form	H ⁺ Hydrogen Na ⁺ Sodium

Application area:

Monodispersed cation exchange resin TOKEM-140 can be applied in all conventional water treatment systems, including:

- softening and demineralizing water treatment systems with co-current regeneration;
- softening and demineralizing water treatment systems with packed bed counter-current regeneration.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE	
Appearance	Spherical beads, yellow to dark brown in colour	
Ionic form	H ⁺	Na ⁺

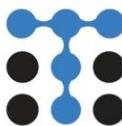


Table con'd (Physical and Chemical Characteristics)

Mean particle size, mm	0.65±0.05	
Uniformity coefficient, max	1.1	
Volume ratio of beads passing through N04 mesh, % max	1.0	
Volume ratio of beads on N08 mesh, % max	2.0	
Moisture retention, %	48-55	
Osmotic stability, %, min	98	
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.9	2.0
Total uncracked beads as shipped, %, min	95	
Mean mechanical toughness, g/bead, min	300	
Beads with toughness below 200 g/bead, %, max	10	
Shipping weight, g/cm ³	0.75-0.80	0.80-0.85
Particle density, g/cm ³	1.20-1.25	1.26-1.30

Processing Characteristics:**SUGGESTED OPERATING CONDITIONS AND MODES:**

Bed depth min, mm	800
Pressure drop coefficient, kPa·h/m ²	1.0
Temperature limit, ° C	120
pH limit	0-14
Swelling at H ⁺ → Na ⁺ , %	5-8
Regenerant, %	
H ⁺ form	(1-1.5-3.0) H ₂ SO ₄
Na ⁺ form	(4-5) HCl (6-10) NaCl
Total rinse requirement, BV	2-4
Backwashing bed expansion, %	50-80



CATION EXCHANGE RESIN TOKEM-140-10

TR 2227-016-72285630-2010

Strong acid cation exchange resin (gel type) with uniform particle range composition. It possesses uniformity range of less than 1.1.

High monodispersity and the absence of small fraction contributes to significantly decreased pressure drop across the bed height. This, in turn, enables high flow rates enhancing regeneration effectiveness and reducing reagent and rinsing water requirements.

Uniform particle composition, compact bed packing, and no dead zones increase diffusion rate and contact area. These features lead to better ion exchange kinetics and improve static and dynamic exchange capacity of the cation exchange resin.

Increased content of crosslinking agent provides for higher capacity, osmotic stability and mechanical strength of this cation exchange resin compared to ordinary resins. These features enable operating it under tougher conditions and with more frequent regenerations, such as in condensate polishing plants.

GENERAL DESCRIPTION

Matrix	styrene-DVB
Functional group	Sulfonic acid
Polymer structure	gel
Ionic form	H ⁺ Hydrogen Na ⁺ Sodium

Application area:

Monodispersed cation exchange resin TOKEM-140-10 can be applied in all conventional water treatment systems, including:

- softening and demineralizing water treatment systems with co-current regeneration;
- softening and demineralizing water treatment systems with packed bed counter-current regeneration
- condensate polishing.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE	
Appearance	Spherical transparent beads, yellow to dark brown in colour	
Ionic form	H ⁺	Na ⁺

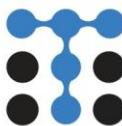
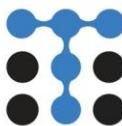


Table con'd (Physical and Chemical Characteristics)

Mean particle size, mm	0.65±0.05	
Uniformity coefficient, max	1.1	
Volume ratio of beads passing through N04 mesh, % max	1.0	
Volume ratio of beads on N08 mesh, % max	2.0	
Moisture retention, %	45-51	41-45
Osmotic stability, %, min	98	
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	2.0	2.1
Total uncracked beads as shipped, %, min	95	
Shipping weight, g/cm ³	0.75-0.80	0.80-0.85
Particle density, g/cm ³	1.20-1.25	1.26-1.30

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:		
Bed depth min, mm	800	
Pressure drop coefficient, kPa·h/m ²	1.0	
Temperature limit, ° C	120	
pH limit	0-14	
Swelling at H ⁺ → Na ⁺ , %	3-6	
Regenerant, % H ⁺ form	(1-1.5-3.0) H ₂ SO ₄ (4-5) HCl (6-10) NaCl	
Na ⁺ form		
Total rinse requirement, BV	2-4	
Backwashing bed expansion, %	50-80	



CATION EXCHANGE RESIN TOKEM-140-16

TR 2227-016-72285630-2010

Strong acid cation exchange resin (gel type) with uniform particle range composition. It possesses uniformity range of less than 1.1. Increased content of crosslinking agent provides for high capacity, osmotic stability and toughness of the resin. These features enable using it in ethanol-amine and morpholine regimes.

High monodispersity and the absence of small fraction contributes to significantly decreased pressure drop across the bed height. This, in turn, enables high flow rates enhancing regeneration effectiveness and reducing reagent and rinsing water requirements.

Uniform particle composition, compact bed packing, and no dead zones increase diffusion rate and contact area. These features improve ion exchange kinetics.

GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	Sulfonic acid
Polymer structure	gel
Ionic form	H ⁺ Hydrogen Na ⁺ Sodium

Application area:

Monodispersed cation exchange resin TOKEM-140-16 can be applied in all conventional water treatment systems, including:

- softening and demineralizing water treatment systems with co-current regeneration;
- softening and demineralizing water treatment systems with packed bed counter-current regeneration
- condensate polishing.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE	
Appearance	Spherical transparent beads, yellow to dark brown in colour	
Ionic form	H ⁺	Na ⁺

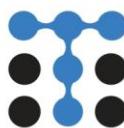
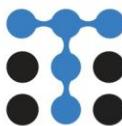


Table con'd (Physical and Chemical Characteristics)

Mean particle size, mm	0.65±0.05	
Uniformity coefficient, max	1.1	
Volume ratio of beads passing through N04 mesh, % max	1.0	
Volume ratio of beads on N08 mesh, % max	2.0	
Moisture retention, %	40-45	36-41
Osmotic stability, %, min	98	
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	2.3	2.4
Total uncracked beads as shipped, %, min	95	
Shipping weight, g/cm ³	0.75-0.80	0.80-0.85
Particle density, g/cm ³	1.20-1.25	1.26-1.30

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:		
Bed depth min, mm	800	
Pressure drop coefficient, kPa·h/m ²	1.0	
Temperature limit, ° C	120	
pH limit	0-14	
Swelling at H ⁺ → Na ⁺ , %	3-6	
Regenerant, %	(1-1.5-3.0) H ₂ SO ₄ (4-5) HCl (6-10) NaCl	
H ⁺ form		
Na ⁺ form		
Total rinse requirement, BV	2-4	
Backwashing bed expansion, %	50-80	



CATION EXCHANGE RESIN TOKEM-100

TR 2227-023-72285630-2011

High capacity strong acid cation exchange resin with improved particle range composition. It is characterized with high chemical stability and mechanical strength.

GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	Sulfonic acid
Polymer structure	gel
Ionic form	H ⁺ Hydrogen Na ⁺ Sodium

Application area:

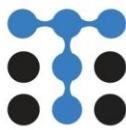
The cation exchange resin can be applied in all conventional ion exchange processes, including:

- softening and demineralizing water treatment systems with co-current regeneration.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE	
Appearance	Spherical beads, yellow to dark brown	
Ionic form	H ⁺	Na ⁺
Mean particle size, mm	0.40-1.25	
Uniformity coefficient, max	1.6	
Effective size fraction proportion, % min	98	
Effective particle size, mm max	0.40-0.55	
Moisture retention, %	48-56	
Osmotic stability, %, min	98	
Total uncracked beads as shipped, %, min	90 (95)*	
Mean mechanical toughness, g/bead, min	300	
Beads with toughness below 200 g/bead, %, max	10	
Shipping weight, g/cm ³	0.75-0.82	0.80 – 0.85
Particle density, g/cm ³	1.17-1.25	1.25-1.29
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.9	2.0

* – The indicator in brackets is given for the product supplied to atomic power stations

**Processing Characteristics:**

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Pressure drop coefficient, kPa·h/m ²	1.35
Temperature limit, °C	120
pH limit	0-14
Swelling at H ⁺ → Na ⁺ , %	5-8
Regenerant, %	
H ⁺ form	(1-1.5-3.0) H ₂ SO ₄ (4-5) HCl (6-10) NaCl
Na ⁺ form	
Total rinse requirement, BV	3-5
Backwashing bed expansion, %	50-80



CATION EXCHANGE RESIN KU-2-8

GOST20298-74

Top grade strong acid cation exchange resin (gel type) with high capacity. It is characterized with high chemical stability and mechanical strength.

GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	Sulfonic acid
Polymer structure	gel
Ionic form*	Hydrogen-salt

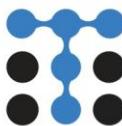
Application area:

- water treatment;
- hydrometallurgy;
- metal plating;
- sewage treatment.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, yellow to dark brown in colour
Particle size range, mm	0.315-1.250
Uniformity coefficient, max	1.7
Volume of effective size fraction, % min	96
Osmotic stability, %, min	94.5
Effective particle size, mm max	0.40-0.55
Moisture retention, %	48-58
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.8
Specific volume, cm ³ /g, in H ⁺ form, max	2.8

* - On customer's demand it can be supplied in Na⁺ form under TR 6-07-493-95



CATION EXCHANGE RESIN TOKEM-100-10

TR 2227-023-72285630-2011

High capacity strong acid cation exchange resin with improved particle range composition. Increased content of crosslinking agent provides for higher toughness, exchange capacity and osmotic stability of the resin. These features enable it to operate with more frequent regeneration compared to an ordinary cation exchange resin.

GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	Sulfonic acid
Polymer structure	gel
Ionic form	H ⁺ Hydrogen Na ⁺ Sodium

Application area:

The cation exchange resin can be applied in all conventional ion exchange processes, including:

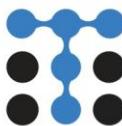
- softening and demineralizing water treatment systems with co-current regeneration;
- condensate polishing.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE	
Appearance	Spherical beads, yellow to dark brown	
Ionic form	H ⁺	Na ⁺
Particle size range, mm	0.40-1.25	
Uniformity coefficient, max	1.6	
Volume of effective size fraction, % min	98	
Effective particle size, mm max	0.40-0.55	
Moisture retention, %	45-51	41-45
Osmotic stability, %, min	98	
Total uncracked beads as shipped, %, min	90	
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	2.0	2.1
Shipping weight, g/cm ³	0.75-0.82	0.80-0.85
Particle density, g/cm ³	1.17-1.25	1.25-1.29

**Processing Characteristics:**

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Pressure drop coefficient, kPa·h/m ²	1.35
Temperature limit, ° C	120
pH limit	0-14
Swelling at H ⁺ → Na ⁺ , %	3-6
Regenerant, %	
H ⁺ form	(1-1.5-3.0) H ₂ SO ₄ (4-5) HCl (6-10) NaCl
Na ⁺ form	
Total rinse requirement, BV	3-5
Backwashing bed expansion, %	50-80



CATION EXCHANGE RESIN TOKEM-200

TR-2227-019-72285630-2009

Weak acid cation exchange resin (porous type) with improved osmotic stability. It is characterized with high total and dynamic exchange capacities.

GENERAL DESCRIPTION	
Matrix	acryl-DVB
Functional group	carboxyl group
Polymer structure	macroporous
Ionic form	H ⁺ Hydrogen Na ⁺ Sodium

Application area:

- removal of bicarbonate water hardness;
- selective removal of iron and other bivalent metals (copper, nickel, zinc);
- in combination with a strong acid cation exchange resin for cation removal;
- as a buffer membrane prior to a strong acid cation exchange resin;
- purification, extraction, concentration and selection of substances in various industries.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE	
Appearance	Spherical opaque beads, white to light yellow	
Ionic form	H ⁺	Na ⁺
Particle size range, mm	0.315-1.600	
Uniformity coefficient, max	1.6	
Volume of effective size fraction, % min	98	
Effective particle size, mm max	0.4-0.6	
Moisture retention, %	45-55	55-65
Osmotic stability, %, min	98	
Total uncracked beads as shipped, %, min	95	
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	4.3	
Dynamic exchange capacity with regenerant requirement target, mmol/cm ³ (mg-eq/cm ³), min	2300	



Table con'd (Physical and Chemical Characteristics)

Mean mechanical toughness, g/bead, min	300	
Particles with toughness below 200 g/bead, %, max	10	
Shipping weight, g/cm ³	0.74-0.80	0.78-0.88
Particle density, g/cm ³	1.14-1.20	1.20-1.25

SUGGESTED OPERATING CONDITIONS AND MODES:

Bed depth min, mm	600
Temperature limit, ° C	120
pH limit	5-14
Swelling at: $H^+ \rightarrow Na^+$ $H^+ \rightarrow Ca^+, %$	40-60 7
Regenerant, %: H^+ form	(0.3-0.8) H_2SO_4 (4-5) HCl
Total rinse requirement, BV	3-5
Backwashing bed expansion, %	80-100



CATION EXCHANGE RESIN TOKEM-120

TR 2227-036-72285630-2014

Strong acid cation resin (porous type). It is characterized with high chemical stability and mechanical strength.

GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	Sulfonic acid
Polymer structure	porous
Ionic form	H ⁺ Hydrogen Na ⁺ Sodium

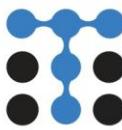
Application area:

This cation exchange resin can be applied in all conventional ion exchange processes, including:

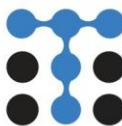
- in softening and demineralization water treatment systems with co-current regeneration;
- processing medium and waste water treatment;
- separation and exclusion of non-ferrous and heavy metals;
- as a catalyst;
- condensate polishing.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE	
Appearance	Spherical beads, light brown to dark grey	
Ionic form	H ⁺	Na ⁺
Particle size range, mm	0.315-1.250	
Uniformity coefficient, max	1.6	
Volume of effective size fraction, % min	96	
Effective particle size, mm max	0.40-0.55	
Moisture retention, %	50-60	45-55
Osmotic stability, %, min	98	
Total uncracked beads as shipped, %, min	90	
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.6	1.7
Shipping weight, g/cm ³	0.72-0.80	0.75 – 0.85
Particle density, g/cm ³	1.16-1.24	1.23-1.28

**Processing Characteristics:**

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Temperature limit, ° C	120
pH limit	0-14
Swelling at H ⁺ → Na ⁺ , %	5-8
Regenerant, %: H ⁺ form	(1-1,5) H ₂ SO ₄ (4-5) HCl (6-10) NaCl
Na ⁺ form	
Total rinse requirement, BV	2-5
Backwashing bed expansion, %	50-80



CATION EXCHANGE RESIN TOKEM-140-10 MB (R)

TR 20.16.59-039-72285630-2016

Strong acid cation exchange resin (gel type) with uniform particle range composition. Its uniformity range is less than 1.1.

High monodispersity and the absence of small fraction contributes to significantly decreased pressure drop across the bed height. This, in turn, enables high flow rates enhancing regeneration effectiveness and reducing reagent and rinsing water requirements.

Uniform particle composition, compact bed packing, and no dead zones increase diffusion rate and contact area. These features improve ion exchange kinetics.

The cation exchange resin is stable to chemical and mechanical stress. This monodispersed resin is characterized with a high osmotic stability. As a result its service life increases at least twice compared to that of polydispersed cation exchange resins.

GENERAL DESCRIPTION

Matrix	styrene-DVB
Functional group	Sulfonic acid
Polymer structure	gel
Ionic form	H ⁺ Hydrogen

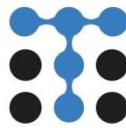
Application area:

Monodispersed cation exchange resin TOKEM-140-10 MB (R) can be applied in all conventional water treatment systems, including:

- regenerable mixed bed filters in combination with monodisperse anion exchange resin TOKEM-840 MB/85 (R).

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, yellow to dark brown in colour
Ionic form	H ⁺



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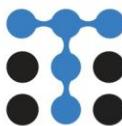
PRODUCTION ASSOCIATION

PARTICLE SIZE DISTRIBUTION

Mean particle size, mm	0.650±0.025
Uniformity coefficient, max	1.1
Volume ratio of beads passing through N04 mesh, % max	1.0
Volume ratio of beads on N08 mesh, % max	2.0
Moisture retention, %	45-51
Osmotic stability, %, min	98
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	2.0
Total uncracked beads as shipped, %, min	95
Difference between settling times of anion and cation resins, sec, max	7
Electrostatic coefficient, % max	20
Shipping weight, g/cm ³	0.75-0.80
Particle density, g/cm ³	1.20-1.25

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Pressure drop coefficient, kPa·h/m ²	1.0
Temperature limit, ° C	120
pH limit	0-14
Swelling at H ⁺ → Na ⁺ , %	7-10
Regenerant, %	(1-1.5-3.0) H ₂ SO ₄ (4-5) HCl
Total rinse requirement, BV	2-4
Backwashing bed expansion, %	50-80



ANION EXCHANGE RESIN TOKEM-800

TR 2227-025-72285630-2011

High capacity strong base anion exchange resin (gel type) with improved particle range composition and osmotic stability.

It effectively removes silicic acid and acid anions from water.

GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	quaternary ammonium basic groups (type 1)
Polymer structure	gel
Ionic form	Cl ⁻ chloride OH ⁻ hydroxyl

Application area:

This anion exchange resin can be applied in all conventional ion exchange processes, including:

- demineralization water treatment systems at co-current regeneration;
- condensate polishing.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, white to brown in colour
Particle size range, mm	0.40-1.25
Volume of effective size fraction, % min	96
Effective particle size, mm max	0.6
Uniformity coefficient, max	1.6
Moisture retention in Cl ⁻ form, %	35-50
Osmotic stability, %, min	95
Bulk volume factor in OH ⁻ form, cm ³ /g	2.7-3.3
Total capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1.15
Equilibrium static exchange capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1.0

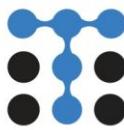


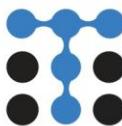
Table con'd (Physical and Chemical Characteristics)

Dynamic exchange capacity with regenerant flowrate target, mmol/m ³ (g-eq/m ³), min	700
Oxidation in oxygen equivalent, mg/l, max	0.55 (0.5)*
Total uncracked beads as shipped, %, min	90 (95)*
Mean mechanical toughness, g/bead, min	300
Particles with toughness below 200 g/bead, %, max	10
Shipping weight, g/cm ³	0.70-0.74
Particle density, g/cm ³	1.06-1.10

* - the indicator in brackets is for the product supplied to atomic power stations

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Pressure drop coefficient, kPa·h/m ²	1.35
Temperature limit, ° C	
Cl ⁻ form	80
OH ⁻ form	60
pH limit	0-14
Swelling at Cl ⁻ → OH ⁻ , %	20
Regenerant, %	(3-4) NaOH
Total rinse requirement, BV	3-6
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN AV-17-8

GOST20301-74

Top grade strong base anion exchange resin (gel type). It is characterized with high chemical stability and mechanical strength.

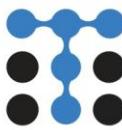
GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	quaternary trimethylammonium groups
Polymer structure	gel
Ionic form	Cl ⁻ chloride

Application area:

- water treatment;
- hydrometallurgy;
- sewage and recycled water treatment;
- chemical industry.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, light yellow to dark brown in colour
Particle size range, mm	0.315-1.250
Volume of effective size fraction, % min	95
Effective particle size, mm max	0.4-0.6
Uniformity coefficient, max	1.7
Moisture retention, %	35-50
Osmotic stability, %, min	92.5
Bulk volume factor in OH- form, cm ³ /g	3.0 ± 0.3
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.15
Equilibrium static exchange capacity, mmol/cm ³ (mg-eq/cm ³), min	1.00
Dynamic exchange capacity with regenerant flowrate target, mmol/m ³ (g-eq/m ³), min	700
Oxidation of product in oxygen equivalent, mg/l, max	0.55



ANION EXCHANGE RESIN TOKEM-801

TR 2227-025-72285630-2011

High capacity strong base anion exchange resin (gel type) with improved particle range composition and osmotic stability.

It effectively removes silicic acid and acid anions from water. Optimal polymer matrix cross-link provides for high exchange kinetics, as well as efficient and economical regeneration of the anion exchange resin.

GENERAL DESCRIPTION

Matrix	styrene-DVB
Functional group	quaternary ammonium basic groups (type 1)
Polymer structure	gel
Ionic form	Cl ⁻ chloride OH ⁻ hydroxyl

Application area:

This anion exchange resin can be applied in all conventional ion exchange processes, including:

- water desalination at thermal power stations and boiler houses;
- processing medium and waste water treatment;
- separation and exclusion of non-ferrous metals.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, white to brown in colour
Particle size range, mm	0.40-1.25
Volume of effective size fraction, % min	96
Effective particle size, mm max	0.6
Uniformity coefficient, max	1.6
Moisture retention in Cl ⁻ form, %	46-52
Osmotic stability, %, min	95
Oxidation of product in oxygen equivalent, mg/l, max	0.55
Total capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1.0
Total uncracked beads as shipped, %, min	95

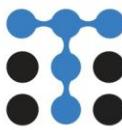
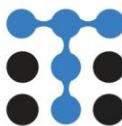


Table con'd (Physical and Chemical Characteristics)

Shipping weight Cl ⁻ form, g/cm ³	0.66-0.73
Particle density in Cl ⁻ form, g/cm ³	1.03-1.09

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Pressure drop coefficient, kPa·h/m ²	1.35
Temperature limit, ° C	
Cl ⁻ form	80
OH ⁻ form	60
pH limit	0-14
Swelling at Cl ⁻ → OH ⁻ , %	30
Regenerant, %	(3-4) NaOH
Total rinse requirement, BV	2-5
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-802

TR 2227-037-72285630-2014

Strong base anion exchange resin (gel type) with high total and dynamic capacity, osmotic and mechanical stability. It differs from type 1 for more efficient regeneration due to its more available functional groups.

GENERAL DESCRIPTION

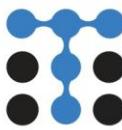
Matrix	styrene-DVB
Functional group	quaternary ammonium basic groups (type 2)
Polymer structure	gel
Ionic form	Cl ⁻ chloride

Application area:

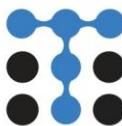
- in desalination units where sorption of all acid anions are carried out at the single anionization stage;
- in conventional co-current water treatment systems for treating water with high content of mineral acid radicals but with low content of silicic and carbon acids.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, white to light yellow in colour
Particle size range, mm	0.315-1.250
Volume of effective size fraction, % min	95
Effective particle size, mm max	0.5-0.6
Uniformity coefficient, max	1.6
Moisture retention, %	45-55
Osmotic stability, %, min	96
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.0
Shipping weight, g/cm ³	0.68-0.75
Particle density, g/cm ³	1.07-1.10

**Processing Characteristics:**

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Temperature limit, ° C	
Cl ⁻ form	80
OH ⁻ form	40
pH limit	0-11
Swelling at Cl ⁻ → OH ⁻ , %	15
Regenerant, %	4 NaOH
Total rinse requirement, BV	2-8
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-840

TR 2227-016-72285630-2010

Strong base anion exchange resin (gel type) with uniform particle range composition. It possesses uniformity range of less than 1.1. High monodispersity and the absence of small fraction contributes to significantly decreased pressure drop across the bed height. This, in turn, enables high flow rates enhancing regeneration effectiveness and reducing reagent and rinsing water requirements. Increased regeneration rate allows decreasing negative impact of organic substances on the ionite. It is specifically important for an anion exchange resin, which by its nature possesses affinity to organic compounds.

Uniform particle composition, compact bed packing, and no dead zones increase diffusion rate and contact area. These features lead to better ion exchange kinetics and improve static and dynamic exchange capacity of the anion exchange resin.

This monodispersed resin is characterized with a high osmotic stability resulting in its longer service life than polydispersed products.

GENERAL DESCRIPTION

Matrix	styrene-DVB
Functional group	quaternary ammonium basic groups (type 1)
Polymer structure	gel
Ionic form	Cl ⁻ chloride OH ⁻ hydroxyl

Application area:

Monodispersed anion exchange resin TOKEM-840 can be applied in all conventional water treatment systems, including:

- ionization water treatment systems with co-current regeneration;
- ionization water treatment systems with counter-current packed bed regeneration;
- condensate polishing.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical transparent beads, white to brown in colour
Particle size range, mm	0.60±0.05
Uniformity coefficient, max	1.1
Volume ratio of beads passing through N04 mesh, % max	1.0

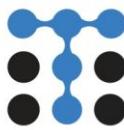


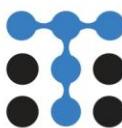
Table con'd (Physical and Chemical Characteristics)

Volume ratio of beads on N08 mesh, % max	2.0
Moisture retention in Cl ⁻ form, %	35-50
Osmotic stability, %, min	98
Total uncracked beads as shipped, %, min	95
Total capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1.15
Equilibrium static exchange capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1.0
Oxidation of water product in oxygen equivalent, mg/l, max	0.55 (0.5)*
Mean mechanical toughness, g/bead, min	300
Beads with toughness below 200 g/bead, %, max	10
Shipping weight in Cl ⁻ form, g/cm ³	0.66-0.72
Particle density in Cl ⁻ form, g/cm ³	1.06-1.10

* - the indicator in brackets is for the product supplied to atomic power stations

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Pressure drop coefficient, kPa·h/m ²	1.0
Temperature limit, ° C	
Cl ⁻ form	80
OH ⁻ form	60
pH limit	0-14
Swelling at Cl ⁻ → OH ⁻ , %	20
Regenerant, %	(3-4) NaOH
Total rinse requirement, BV	2-4
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-841

TR 2227-016-72285630-2010

Strong base anion exchange resin (gel type) with uniform particle range composition. It possesses uniformity range of less than 1.1.

High monodispersity and the absence of small fraction contributes to significantly decreased pressure drop across the bed height. This, in turn, enables high flow rates enhancing regeneration effectiveness and reducing reagent and rinsing water requirements. Increased regeneration rate allows decreasing negative impact of organic substances on the anion exchange resin.

Uniform particle composition, compact bed packing, and no dead zones increase diffusion rate and contact area. These features lead to better ion exchange kinetics.

This monodispersed anion exchange resin is characterized with a high osmotic stability resulting in its longer service life compared to polydispersed products.

GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	quaternary ammonium basic groups (type 1)
Polymer structure Ionic form	gel Cl ⁻ chloride OH ⁻ hydroxyl

Application area:

Monodispersed anion exchange resin TOKEM-841 can be applied in all conventional water treatment systems, including:

- ionization water treatment systems with co-current regeneration;
- ionization water treatment systems with counter-current packed bed regeneration;
- as a bottom layer in the case layered charging of anion exchange resins in one filter.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical transparent beads, white to brown in colour
Particle size range, mm	0.60±0.05
Uniformity coefficient, max	1.1
Volume ratio of beads passing through N04 mesh, % max	1.0

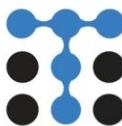


Table con'd (Physical and Chemical Characteristics)

Volume ratio of beads on N08 mesh, % max	2.0
Moisture retention in Cl ⁻ form, %	46-52
Osmotic stability, %, min	98
Total uncracked beads as shipped, %, min	95
Total capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1.0
Equilibrium static exchange capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	0.9
Oxidation of product in oxygen equivalent, mg/l, max	0.55
Shipping weight in Cl ⁻ form, g/cm ³	0.66-0.72
Particle density, g/cm ³	1.06-1.10

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Pressure drop coefficient, kPa·h/m ²	1.0
Temperature limit, ° C	
Cl ⁻ form	80
OH ⁻ form	60
pH limit	0-14
Swelling at Cl ⁻ → OH ⁻ , %	30
Regenerant, %	(3-4) NaOH
Total rinse requirement, BV	2-4
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-842

TR 2227-016-72285630-2010

Strong base anion exchange resin (gel type) with uniform particle range composition. It possesses uniformity range of less than 1.1.

High monodispersity and the absence of small fraction contributes to significantly decreased pressure drop across the bed height. This, in turn, enables high flow rates enhancing regeneration effectiveness and reducing reagent and rinsing water requirements. Increased regeneration rate allows decreasing negative impact of organic substances on the anion exchange resin.

Uniform particle composition, compact bed packing, and no dead zones increase diffusion rate and contact area. These features improve ion exchange kinetics.

This monodispersed resin is characterized with a high osmotic stability resulting in its longer service life compared to polydispersed products. It differs from type 1 for more efficient regeneration due to its more available functional groups.

GENERAL DESCRIPTION

Matrix	styrene-DVB
Functional group	quaternary ammonium basic groups (type 2)
Polymer structure Polymer	gel
Structure Ionic form	Cl ⁻ chloride

Application area:

Monodispersed anion exchange resin TOKEM-842 can be applied in all conventional water treatment systems, including:

- in desalination units where sorption of all acid anions are carried out at the single anionization stage;
- in conventional co-current and modern counter-current water treatment systems for treating water with high content of mineral acid radicals but with low content of silicic and carbon acids.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical transparent beads, white to light yellow in colour

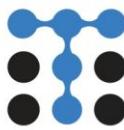


Table con'd (Physical and Chemical Characteristics)

Mean particle size, mm	0.60±0.05
Uniformity coefficient, max	1.1
Volume ratio of beads passing through N04 mesh, % max	1.0
Volume ratio of beads on N08 mesh, % max	2.0
Moisture retention in Cl ⁻ form, %	45-55
Osmotic stability, %, min	96
Total capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1,0
Shipping weight, g/cm ³	0.68-0.75
Particle density, g/cm ³	1.07-1.10

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Pressure drop coefficient, kPa·h/m ²	1.0
Temperature limit, ° C	
Cl ⁻ form	80
OH ⁻ form	40
pH limit	0-11
Swelling at Cl ⁻ → OH ⁻ , %	15
Regenerant, %	4 NaOH
Total rinse requirement, BV	2-8
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-320

TR 2227-035-72285630-2014

Weak base anion exchange resin (porous type) with high exchange capacity and osmotic stability, resistant to organic fouling. In combination with strong base anion exchange resin it ensures minimum silicic acid slip. It removes organic molecules more efficiently than gel products.

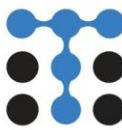
GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	tertiary amine
Polymer structure	porous
Ionic form	free base

Application area:

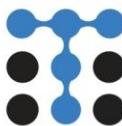
- water demineralization for industrial vapour generation;
- organic matter removal.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical opaque beads, opaline to yellow in colour
Particle size range, mm	0.315-1.250
Volume of effective size fraction, % min	98
Effective particle size, mm	0.4-0.6
Uniformity coefficient, max	1.6
Moisture retention, %	50-60
Osmotic stability, %, min	99
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.5
Dynamic exchange capacity with regenerant requirement target, mmol/m ³ (g-eq/m ³), min	1000
Shipping weight, g/cm ³	0.65-0.72
Particle density, g/cm ³	1.03-1.07

**Processing Characteristics:**

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Temperature limit, ° C	60
pH limit	0-8
Swelling at Cl⁻ → free base, %	20-25
Regenerant, %	(2-4) NaOH
Total rinse requirement, BV	4-9
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-320 Y (M)

TR 2227-035-72285630-2014

Weak base anion exchange resin (porous type) of narrower particle size distribution. It is characterized with high exchange capacity, osmotic stability, and resistance to organic fouling. In combination with strong base anion exchange resin it ensures minimum silicic acid slip and more efficient removal of organic molecules in comparison with gel products.

GENERAL DESCRIPTION

Matrix	styrene-DVB
Functional group	tertiary amine
Polymer structure	porous
Ionic form	free base

Application area:

- water demineralization for vapour generation;
- organic matter removal;
- as an upper layer in counter-current regeneration patterns in the case layered charging of anion exchange resins in one filter.

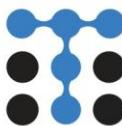
Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical opaque beads, opaline to yellow in colour
PARTICLE SIZE DISTRIBUTION	
Particle size range, mm	0.40-0.70
Volume of effective size fraction, % min	98
Effective particle size, mm	0.45-0.55
Uniformity coefficient, max	1.4
Moisture retention, %	50-60
Osmotic stability, %, min	99
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.5
Dynamic exchange capacity with regenerant requirement target, mmol/m ³ (g-eq/m ³), min	1000
Shipping weight, g/cm ³	0.65-0.72
Particle density, g/cm ³	1.03-1.07

**Processing Characteristics:**

SUGGESTED OPERATING CONDITIONS AND MODES:

Bed depth min, mm	800
Temperature limit, ° C	60
pH limit	0-8
Swelling at Cl ⁻ → free base, %	20-25
Regenerant, %	(2-4) NaOH
Total rinse requirement, BV	4-9
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-400

TR 2227-032-72285630-2014

Weak base anion exchange resin (gel type) with high exchange capacity, mechanical and osmotic stability, resistant to organic fouling. The resin is characterized with high capacities. It resists organic contamination better than weak base polystyrene anion exchange resins.

GENERAL DESCRIPTION	
Matrix	polyacrylic
Functional group	tertiary amine
Polymer structure	porous
Ionic form	free base

Application area:

- water desalination for industrial vapour generation;
- organic matter removal.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, opaline to yellow in colour
Particle size range, mm	0.315-1.25
Uniformity coefficient, max	1.6
Effective size fraction proportion, % min	95
Effective particle size, mm	0.4-0.7
Moisture retention, %	54-64
Osmotic stability, %, min	98
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.6
Dynamic exchange capacity with regenerant requirement target, mmol/m ³ (g-eq/m ³), min	1200
Total uncracked beads as shipped, %, min*	95

*- the indicator is standardized when the product is supplied to atomic power stations



Table con'd (Physical and Chemical Characteristics)

Mean mechanical toughness, g/bead, min	300
Particles with toughness below 200 g/bead, % max	10
Shipping weight, g/cm ³	0.66-0.74
Particle density, g/cm ³	1.04-1.09

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth, min, mm	800
Temperature limit, ° C	40
pH limit	0-8
Swelling at Cl ⁻ → free base, %	25
Regenerant, %	(2-4) NaOH
Total rinse requirement, BV	8-14
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-420

TR 2227-035-72285630-2014

Weak base anion exchange resin (porous type) with high exchange capacity, mechanical and osmotic stability. It is resistant to organic fouling. Its particular feature is a high capacity of ionite which enables longer filter runs.

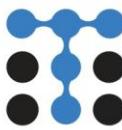
GENERAL DESCRIPTION	
Matrix	polyacrylic
Functional group	tertiary amine
Polymer structure	porous
Ionic form	free base

Application area:

- demineralization of water with high organic content in co-current water treatment systems of steam power plants.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical opaque beads, opaline to yellow in colour
Particle size range, mm	0.315-1.250
Uniformity coefficient, max	1.6
Volume of effective size fraction, % min	98
Effective particle size, mm	0.4-0.6
Moisture retention, %	50-60
Osmotic stability, %, min	99
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	2.2
Dynamic exchange capacity with regenerant requirement target, mmol/m ³ (g-eq/m ³), min	1500
Shipping weight, g/cm ³	0.65-0.75
Particle density, g/cm ³	1.10-1.16

**Processing Characteristics:**

SUGGESTED OPERATING CONDITIONS AND MODES:

Bed depth min, mm	650
Temperature limit, ° C	40
pH limit	0-9
Swelling at Cl ⁻ → free base, %	15
Regenerant, %	(2-4) NaOH
Total rinse requirement, BV	8-10
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-820

TR 2227-037-72285630-2014

Strong base macroporous anion exchange resin with high exchange capacity and osmotic stability.

GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	quaternary ammonium basic groups (type 1)
Polymer structure	porous
Ionic form	Cl ⁻ chloride OH ⁻ hydroxyllic

Application area:

In Cl⁻ form the resin is applied as a scavenger for organics to protect the downstream anion exchange filter from organic poisoning;

In OH⁻ form:

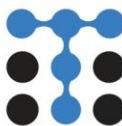
- in conventional co-current water treatment systems for efficient removal of silicic ions;
- for condensate polishing.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical opaque beads, white to light yellow
Partcile size range, mm	0.315-1.250
Volume of effective size fraction, % min	95
Effective particle size, mm	0.5-0.6
Uniformity coefficient, max	1.6
Moisture retention in Cl ⁻ form, %	50-60
Osmotic stability, %, min	96
Total capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1.0
Shipping weight in Cl ⁻ form, g/cm ³	0.65-0.73
Particle density in Cl ⁻ form, g/cm ³	1.05-1.10

**Processing Characteristics:**

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	800
Temperature limit, ° C	
Cl ⁻ form	80
OH ⁻ form	60
pH limit	0-12
Swelling at Cl ⁻ → OH ⁻ , %	20
Regenerant, %:	
Cl ⁻ form	10 NaCl + (1-2) NaOH
OH ⁻ form	(3-4) NaOH
Total rinse requirement, BV	4-7
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-822

TR 2227-037-72285630-2014

Strong base anion exchange resin (porous type) with high capacities and osmotic stability. It ensures more efficient removal of organic molecules in comparison with gel products.

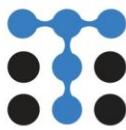
GENERAL DESCRIPTION	
Matrix	styrene-DVB
Functional group	quaternary ammonium basic groups (type 2)
Polymer structure	porous
Ionic form	Cl ⁻ chloride

Application area:

- in desalination plants where sorption of all acid anions are carried out at one stage anionization;
- in conventional co-current water treatment systems for treating water with high content of mineral acid radicals and organic substances but with low content of silicic and carbon acids as a protection from organic compounds.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical opaque beads, white to light yellow
Partcile size range, mm	0.315-1.250
Volume of effective size fraction, % min	95
Effective particle size, mm	0.5-0.6
Uniformity coefficient, max	1.6
Moisture retention in Cl ⁻ form, %	47-57
Osmotic stability, %, min	96
Total capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1.0
Shipping weight, g/cm ³	0.68-0.74
Particle density, g/cm ³	1.07-1.10

**Processing Characteristics:****SUGGESTED OPERATING CONDITIONS AND MODES:**

Bed depth min, mm	800
Temperature limit, ° C	
Cl ⁻ form	80
OH ⁻ form	30
pH limit	0-11
Swelling at Cl ⁻ → OH ⁻ , %	12
Regenerant, %	(4-5) NaOH
Total rinse requirement, BV	4-7
Backwashing bed expansion, %	80-100



ANION EXCHANGE RESIN TOKEM-900

TR 2227-038-72285630-2014

Strong base anion exchange resin (gel type). Efficient scavenger for organics. Owing to its acryl structure, the anion exchange resin easily absorbs and desorbs organic molecules. It is resistant to organic compound impact.

High exchange capacity, mechanical and osmotic stability make this resin indispensable for desalination systems, particularly if a minimum slip of silicic acid is required.

GENERAL DESCRIPTION

Matrix	acryl-DVB
Functional group	quaternary and tertiary ammonium basic groups (type 1)
Polymer structure	gel
Ionic form	Cl ⁻ chloride

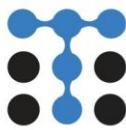
Application area:

In Cl⁻ form it is applied as a scavenger for organics to protect the downstream anion exchange filter from organic poisoning.

In OH⁻ form it is applied in conventional co-current water treatment systems for efficient removal of silicic ions.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical transparent beads, white to light yellow
Partcile size range, mm	0.315-1.250
Volume of effective size fraction, % min	95
Effective particle size, mm	0.5-0.7
Uniformity coefficient, max	1.6
Moisture retention in Cl ⁻ form, %	54-64
Osmotic stability, %, min	96
Total capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	1.0
Shipping weight, g/cm ³	0.65-0.75
Particle density, g/cm ³	1.05-1.10

**TOKEM**| PRODUCTION ASSOCIATION

Processing Characteristics:**SUGGESTED OPERATING CONDITIONS AND MODES:**

Bed depth min, mm	800
Temperature limit, ° C	
Cl ⁻ form	40
OH ⁻ form	30
pH limit	0-14
Swelling at Cl ⁻ → OH ⁻ , %	25
Regenerant, %	
Cl ⁻ form	10 NaCl + (1-2) NaOH
OH ⁻ form	(2-4) NaOH
Total rinse requirement, BV	6-10
Backwashing bed expansion, %	80-100

ANION EXCHANGE RESIN TOKEM-920

TR 2227-038-72285630-2014

Macroporous strong base anion exchange resin. Efficient scavenger for organics. Owing to its acryl structure the anion exchange resin easily absorbs and desorbs organic molecules. It is resistant to organic compound impact.

GENERAL DESCRIPTION

Matrix	acryl-DVB
Functional group	quaternary and tertiary ammonium basic groups (type 1)
Polymer structure	macroporous
Ionic form	Cl ⁻ chloride

Application area:

In Cl⁻ form the resin is applied as a scavenger for organics to protect the downstream anion exchange filter from organic poisoning;

In OH⁻ form it is applied in conventional co-current water treatment systems for efficient removal of silicic ions.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical transparent beads, white to light yellow
Partcile size range, mm	0.315-1.250
Volume of effective size fraction, % min	95
Effective particle size, mm	0.4-0.7
Uniformity coefficient, max	1.6
Moisture retention, %	66-72
Osmotic stability, %, min	90
Total capacity in OH ⁻ form, mmol/cm ³ (mg-eq/cm ³), min	0.7
Shipping weight, g/cm ³	0.65-0.73
Particle density, g/cm ³	1.04-1.10

**Processing Characteristics:**

SUGGESTED OPERATING CONDITIONS AND MODES:

Bed depth, min, mm	800
Temperature limit, ° C	
Cl ⁻ form	40
OH ⁻ form	30
pH limit	0-14
Swelling at Cl ⁻ → OH ⁻ , %	25
Regenerant, %:	
Cl ⁻ form	10 NaCl + (1-2) NaOH
OH ⁻ form	(3-4) NaOH
Total rinse requirement, BV	6-10
Backwashing bed expansion, %	80-100

ANION EXCHANGE RESIN TOKEM-840 MB/85 (R)

TR 20.16.59-039-72285630-2016

Strong base anion exchange resin (gel type) with uniform particle range composition. It possesses uniformity range of less than 1.1. Conversion to OH⁻ form is not less than 85%.

High monodispersity and the absence of small fraction contributes to significantly decreased pressure drop across the bed height. This, in turn, enables high flow rates enhancing regeneration effectiveness and reducing reagent and rinsing water requirements. Increased regeneration rate allows decreasing negative impact of organic substances on the ionite.

Uniform particle composition, compact bed packing, and no dead zones increase diffusion rate and contact area. These features improve ion exchange kinetics.

A high osmotic stability of the monodisperse resin results in increase in its service life compared to that of polydispersed products.

GENERAL DESCRIPTION

Matrix	styrene-DVB
Functional group	quaternary ammonium basic groups (type 1)
Polymer structure	gel
Ionic form	OH ⁻ hydroxyl

Application area:

Monodispersed anion exchange resin TOKEM-840 MB/85 (R) can be applied in all conventional water treatment systems, including:

- mixed bed regeneration filters in combination with monodisperse cation exchange resin TOKEM-140-10 MB (R).

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, bright yellow to brown in colour



PARTICLE SIZE DISTRIBUTION

Mean particle size, mm	0.575±0.025
Uniformity coefficient, max	1.1
Volume ratio of beads passing through N04 mesh, % max	1.0
Volume ratio of beads on N08 mesh, % max	2.0
Osmotic stability, %, min	95
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	1.1
Total uncracked beads as shipped, %, min	95
Equilibrium static exchange capacity, mmol/cm ³ (mg-eq/cm ³), min	1.0
Difference between settling times of anion and cation resins, sec, max	7
Electrostatic coefficient, % max	20
Shipping weight, g/cm ³	0.68-0.74
Particle density, g/cm ³	1.06-1.10

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth, min, mm	800
Temperature limit, ° C	60
Pressure drop coefficient, kPa·h/m ²	1.0
Total rinse requirement, BV	2-4
pH limit	1-14
Swelling at Cl ⁻ → OH ⁻ , %	20
Regenerant, %	(3-4) NaOH
Backwashing bed expansion, %	80-100

TOKEM MB-50 (R)

TR 20.16.59-039-72285630-2016

TOKEM MB-50 (R) is a ready mixture of monodisperse Type I strong base anion exchange resin and monodisperse strong acid cation exchange resin for mix bed regeneration filters.

GENERAL DESCRIPTION

Matrix	styrene-DVB
Functional group	Sulfonic acid/quaternary amine (type 1)
Polymer structure	gel
Ionic form	H ⁺ / OH ⁻ Hydrogen / hydroxyl

Application area:

TOKEM MB-50 (R) is used for water purification in regenerable mix bed filters.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, yellow to dark brown
Ion exchange resin content, volume %	
Cation exchange resin	50±5
Anion exchange resin	50±5
PARTICLE SIZE DISTRIBUTION	
Mean particle size, mm	
Cation exchange resin	0.650±0.025
Anion exchange resin	0.575±0.025
Uniformity coefficient, max	
Cation exchange resin	1.1
Anion exchange resin	1.1
Moisture retention, %	
Cation exchange resin	45-51
Anion exchange resin	55-60
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	
Cation exchange resin	2.0
Anion exchange resin	1.1
Difference between settling times of anion and cation resins, sec, max	7
Electrostatic coefficient, % max	20



PRODUCTION ASSOCIATION

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:

Bed depth, min, mm	800
Temperature limit, ° C	60
pH limit	0-14
Regenerant, %	(1-1.5-3.0) H ₂ SO ₄
Cation exchange resin	(4-5) HCl
Anion exchange resin	(3-4) NaOH
Total rinse requirement, BV	2-4

TOKEM MB-40 (R)

TR 20.16.59-039-72285630-2016

TOKEM MB-40 (R) is a ready mixture of Type I strong base anion exchange resin and strong acid cation exchange resin for non-regenerable mix bed filters.

GENERAL DESCRIPTION

Matrix	styrene-DVB
Functional group	Sulfonic acid/quaternary amine (type 1)
Polymer structure	gel
Ionic form	H ⁺ / OH ⁻ Hydrogen / hydroxyl

Application area:

TOKEM MB-40 (R) is used for water purification in non-regenerable mix bed filters.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	Spherical beads, yellow to dark brown
Ion exchange resin content, volume %	
Cation exchange resin	60±5
Anion exchange resin	40±5
PARTICLE SIZE DISTRIBUTION	
Particle size range, mm	0.315-1.250
Uniformity coefficient, max	1.6
Moisture retention, %	
Cation exchange resin	45-51
Anion exchange resin	60-65
Total capacity, mmol/cm ³ (mg-eq/cm ³), min	
Cation exchange resin	2.0
Anion exchange resin	1.1
Difference between settling times of anion and cation resins, sec, max	6
Electrostatic coefficient, % max	20



PRODUCTION ASSOCIATION

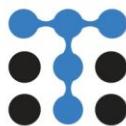
Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:

Bed depth, min, mm	800
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Temperature limit, ° C	60
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pH limit	0-14
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**TOKEM-PPC**

TR 2210-040-72285630-2014

Polypropylene-based inert material.

Application area:

It is applied as upper protection layer in ion exchangers (mostly with packed bed, co-current or counter-current regeneration). It improves distribution of flow during operation and that of regenerant during regeneration. It protects from blocking the distribution unit openings with resin particles.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	White beads
Particle size range, mm	2.0-5.0
Shipping weight, g/cm ³	0.50-0.57
Particle density, g/cm ³	0.88-0.92

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth, min, mm	200
Temperature limit, ° C	100
pH limit	0-14

**TOKEM**

| PRODUCTION ASSOCIATION

TOKEM-PPE

TR 2210-040-72285630-2014

Inert material based on high pressure polyethylene.

Application area:

It is applied as upper protection layer in ion exchangers (mostly with packed bed, co-current or counter-current regeneration).

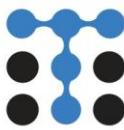
It improves distribution of flow during operation and that of regenerant during regeneration. It protects from blocking the distribution unit openings with resin particles.

Physical and Chemical Characteristics:

CHARACTERISTIC	STANDARD VALUE
Appearance	White beads
Particle size range, mm	2.0-5.0
Shipping weight, g/cm ³	0.50-0.60
Particle density, g/cm ³	0.915-0.925

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth, min, mm	200
Temperature limit, ° C	100
pH limit	0-14



TOKEM-SDS

TR 2210-040-72285630-2014

Inert material with spherical beads based on styrene-divinylbenzene copolymer.

Application area:

It is applied as upper protection layer in ion exchangers (mostly with packed bed, co-current or counter-current regeneration).
It improves distribution of flow during operation and that of regenerant during regeneration. It protects from blocking the distribution unit openings with resin particles.
In addition, it can be used as a medium for filtering particulate contamination.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	White spherical beads with yellowish shade
Particle size range, mm	0.8-2.5
Shipping weight, g/cm ³	0.55-0.65
Particle density, g/cm ³	1.05-1.07

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth, min, mm	200
Temperature limit, ° C	100
pH limit	0-14

TOKEM-PPS MB

TR 2210-040-72285630-2014

Polyamide-based inert material.

Application area:

It is applied in mixed bed ion filters to reduce ionite cross contamination during regeneration. Shipping weight and particle density of this material is selected to provide buffer zone between strong base anion exchange resin and strong acid cation one.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	White beads
Particle size range, mm	2.0-3.0
Shipping weight, g/cm ³	0.70-0.75
Particle density, g/cm ³	1.10-1.15

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth, min, mm	100
Temperature limit, ° C	100
pH limit	0-14

COPOLYMER-8

TR 2414-018-72285630-2009

Inert material in the form of spherical beads based on styrene–divinylbenzene copolymer.

Application area:

It is applied as upper protection layer in ion exchangers (mostly with packed bed, co-current or counter-current regeneration).

It improves distribution of flow during operation and that of regenerant during regeneration. It protects from blocking the distribution unit openings with resin particles.

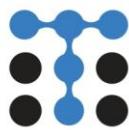
In addition, it can be used as a medium for filtering particulate contamination.

Physical and Chemical Characteristics:

CHARACTERISTICS	STANDARD VALUE
Appearance	White spherical beads with yellowish shade
Particle size range, mm	0.4-0.8
Shipping weight, g/cm ³	0.55-0.65
Particle density, g/cm ³	1.05-1.07

Processing Characteristics:

SUGGESTED OPERATING CONDITIONS AND MODES:	
Bed depth min, mm	200
Temperature limit, ° C	100
pH limit	0-14



TOKEM | PRODUCTION ASSOCIATION

“TOKEM” Production Association LLC (ООО) has implemented quality management system with regard to development and production of chemical products in accordance with GOST R ISO 9001 – 2015
(ISO 9001 : 2015). Registration N ROSS RU.AC13.K00030





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