



Z G A 307

Strong Base Type I Anion Exchange Resin

DESCRIPTION

“Zheng Guang” Brand ZGA307 is a standard gel strong base Type I quaternary ammonium anion exchange resin with a styrene-DVB copolymer matrix. It has both high operating capacity and the ability to achieve low residual silica levels. ZGA307 anion exchange resin is intended for use in all types of deionization systems and chemical processing applications. The anion exchange resin is mainly used in the preparation of pure water, waste water treatment and separation of biochemicals.

It is supplied in chloride or hydroxide form. ZGA307 series contains four products: ZGA307 for general use; ZG A 307 SF for double compartment bed, dual bed and floating bed system; ZGA307 FC for double compartment bed and floating bed system; ZGA307 MB for mixed bed system.

FEATURES & BENEFITS

- **COMPLIES WITH FDA REGULATIONS FOR POTABLE WATER APPLICATIONS**

Conforms to paragraph 21CFR 173.25 of the Food Additives Regulations of the F.D.A.

- **UNIFORM PARTICLE SIZE**

95% of beads are in the assignation range; giving a lower pressure drop and superior kinetics.

- **HIGH TOTAL CAPACITY**

The high total capacity of ZGA307 allows greater operating capacity in applications.

- **SUPERIOR PHYSICAL STABILITY**

Over 93% sphericity combined with high crush strengths and uniform particle size provide greater resistance to bead breakage due to mechanical, thermal or osmotic stresses.

ZGA 307 PROPERTIES

Item	ZGA 307	ZGA 207 FC	ZGA 307 SC	ZGA 307 MB
Polymer Matrix Structure	Polystyrene crosslinked with DVB			
Type	Gel strong basic Type I anion exchange resin			
Appearance	Light yellow or golden spherical beads			
Functional Group	R-N ⁺ (CH ₃) ₃ X ⁻			
Moisture Content %	42~48			
Total Capacity meq/g	≥ 3.6 (Cl)			
meq/ml	≥ 1.145 (Cl) ^{1.4}			
Strong Base Capacity meq/g	≥ 3.5 (Cl)			
Screen Size Range (U.S. standard screen)	55-16	30-16		45-20
	≥ 95	≥ 95		≥ 95
Sphericity %	≥ 93			
Uniformity Coefficient, Approx.	< 1.6			
pH Range	1~14			

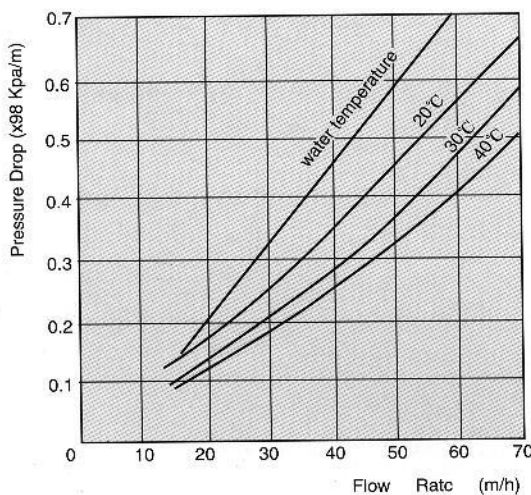
SUGGESTED OPERATING CONDITIONS

Maximum Temperature	
Chloride Form	170°F
Hydroxide Form	140°F
Backwash Rate	50~75% Bed Expansion
pH range	1~14
Swelling, $Cl^- \rightarrow OH^-$	$\leq 25\%$
Regenerant	NaOH
Regenerant Flow Rate	3~5 m/h
Regenerant Contact Time	> 30 min
Regenerant Level	100~120 g/eq
Displacement Rinse Rate	2~5 m/h
Service Flow Rate	15~40 m/h

HYDRAULIC PROPERTIES

The pressure drop "headloss" across a bed of ion exchange resin depends on the particle size distribution, bed depth, operating water temperature and downflow or upflow.

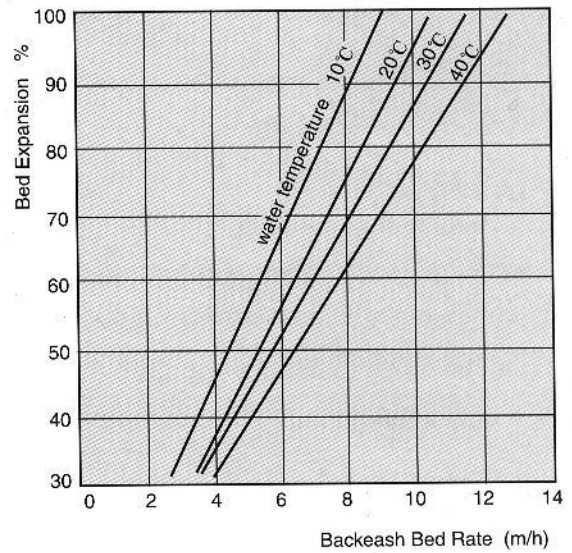
Fig.1 PRESSURE DROP VS FLOW RATE



BACKWASH BED EXPANSION

During backwash, the resin bed should be expanded. Bed expansion depends on the water temperature, flow rate, the resin particle size and true density. The expansion increases with backwash flow rate and decreases with temperature, as shown in Fig. 2.

Fig. 2 BACKWASH BED EXPANSION



OPERATING CAPACITY

Operating capacity is influenced by many factors such as regenerant level, regenerant temperature, the silica leakage, the content of silica, total anions, the type of regeneration and so on.

Fig.3 OPERATING CAPACITY

Conditions:

Regeneration Type	Dowflow
Regenerant	Industrial grade
	$[Cl^-]/[OH^-] = 11.4\%$
Bed Depth	1.6 m
Service Flow Rate	20 m/h
Water Temperature	20°C
Influent $[SiO_2]$	5 mg/L

C_{Σ} : Total Anions

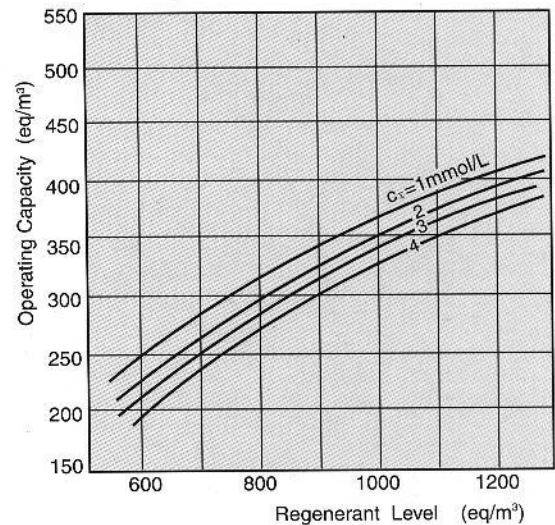


Fig 4 and Fig 5 show the operating capacity of ZGA307 is a function of the content of silicon dioxide.

Fig. 4 ZGA 307 OPERATING CAPACITY FOR 10 mg/L SiO₂

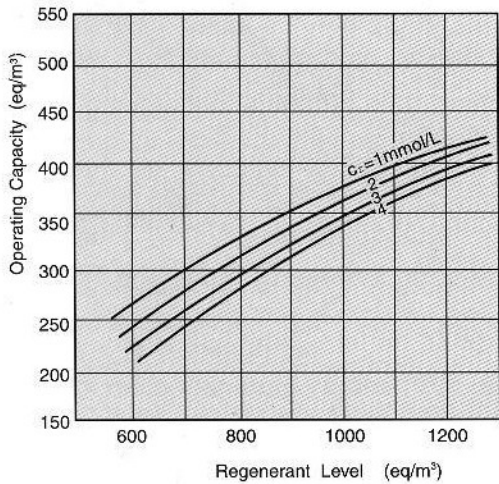
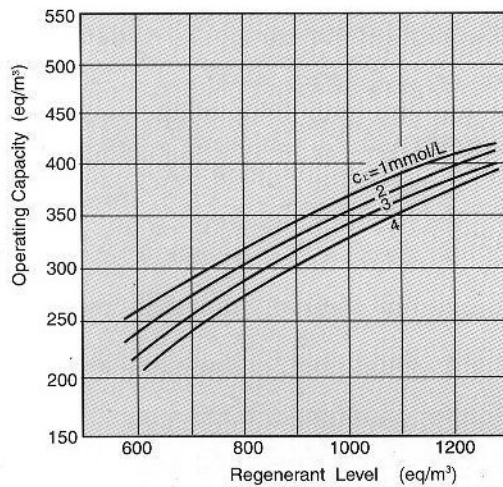


Fig.5 ZGA 307 OPERATING CAPACITY FOR 20 mg/L SiO₂



COUNTER-FLOW REGENERATION ZGA 307 OPERATING CAPACITY

Conditions:

- Regenerant Industrial grade
[Cl⁻] / [OH⁻] = 11.4%
- Regenerant temperature 40°C
- Bed Depth 2.0 m
- Service Flow Rate 30 m/h
- Water Temperature 20°C
- Influent [SiO₂] 5 mg/L
- [SO₄²⁻] / ([SO₄²⁻] + [Cl⁻]) = 0.4
- C_Σ : Total Anions

Fig.6 COUNTER-FLOW REGENERATION ZGA 307 OPERATING CAPACITY for 5mg/L SiO₂

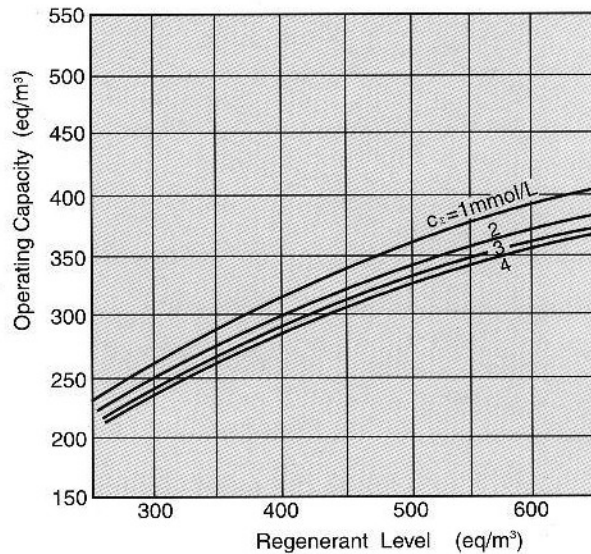


Fig. 7 COUNTER-FLOW REGENERATION ZG A 307 OPERATING CAPACITY FOR 10 mg /L SiO₂

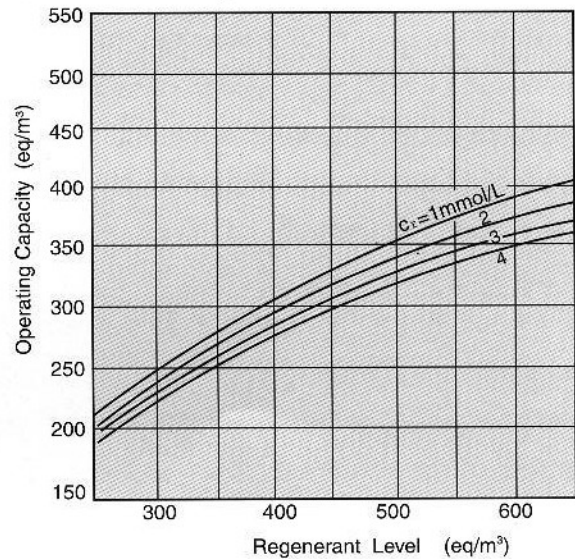
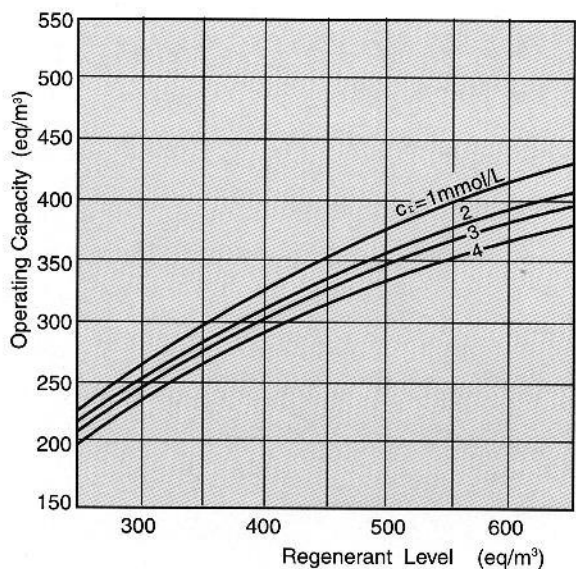


Fig.8 COUNTER-FLOW REGENERATION ZG A 307 OPERATING CAPACITY FOR 20 mg/L SiO₂



CHEMICAL AND PHYSICAL STABILITY

ZGA 307 gel strong base anion exchange resin is insoluble in moderately concentrated acids, alkalis and in all common organic solvents. The resin has high operating capacity and excellent mechanical stability. It has good bead strength and excellent integrity, a minimum of 95%. It demonstrates a high resistance to attrition from all stresses, physical, thermal and osmotic. Usually it has a longer service life. However, exposure to significant amounts of free chlorine, "hypochlorite" ions, or other strong oxidizing agents over a period of time will degrade the resin and break down the crosslinking. This can reduce the ion exchange capacity or increase the moisture retention of the resin, decreasing its mechanical strength, and should be avoided. The resin in the hydroxide form under alkaline conditions will break down at temperatures over about 70°C (160°F). The quaternary ammonium group loses the nitrogen and becomes weak-base group. The salt forms of the resin are at least more stable, but can still break down at higher temperature with loss of strong base capacity.

APPLICATIONS DEMINERALIZATION

ZGA 307 Type I strong basic resin is widely used in multiple and mixed bed demineralizers, wherever complete ion removal and physical and osmotic stability are required. Its high total capacity and low swelling on regeneration provides maximum operating capacity in deionization applications for all applications from ultra-pure to waste water treatment and precious metal recoveries.

ZGA 307 strongly basic anionic resin together with weak basic resin used in dual bed, prepares pure water and ultra-pure water. The real density and particle size range of two resins are quite different. They can be easily separated.

DESILICIZERS

The Type I strongly base resin can remove all ionized substances, including weak acids such as silica and carbonic acid as well as strong acids, sulfate and chloride. Type I anion exchangers have greater thermal and oxidation resistance than other types of strong base resins and can be operated at higher temperatures to insure low silica leakages. The resin operated in the hydroxide cycle is a very effective way of providing low silica and low hardness water for medium and high pressure boilers.

OTHER APPLICATIONS

ZGA 307 Type I strong basic resin can widely be used in many fields, such as food industry, decoloration of cane sugar and corn syrup, pharmaceutical industry, hydro- metallurgy and separation of antibiotic and biochemicals, recovery of metals and so on.