

# CR-100

## CHARACTERISTICS

Screen size (U.S. Standard Dry) - 8 – 50 Mesh  
Water Retention - 50%  
pH Range / 6-11  
Approximate Shipping Weight - 50 lb. / Cu. Ft.  
Standard Packaging - 1 Cu. Ft. Bag  
Physical Appearance - Grey/White Crystal  
Backwash Flow Rate 8 – 10 G.P.M. Per Sq. Ft.

## INFLUENT LEVELS

Combination of Manganese & Iron up to 15 P.P.M.  
Hydrogen Sulfide (H<sub>2</sub>S) Less than .5 P.P.M.  
Hardness as CaCO<sub>3</sub> 3 G.P.G. Minimum  
Minimum T.D.S. 80 P.P.M.

## CAPACITY PER CU. FT.

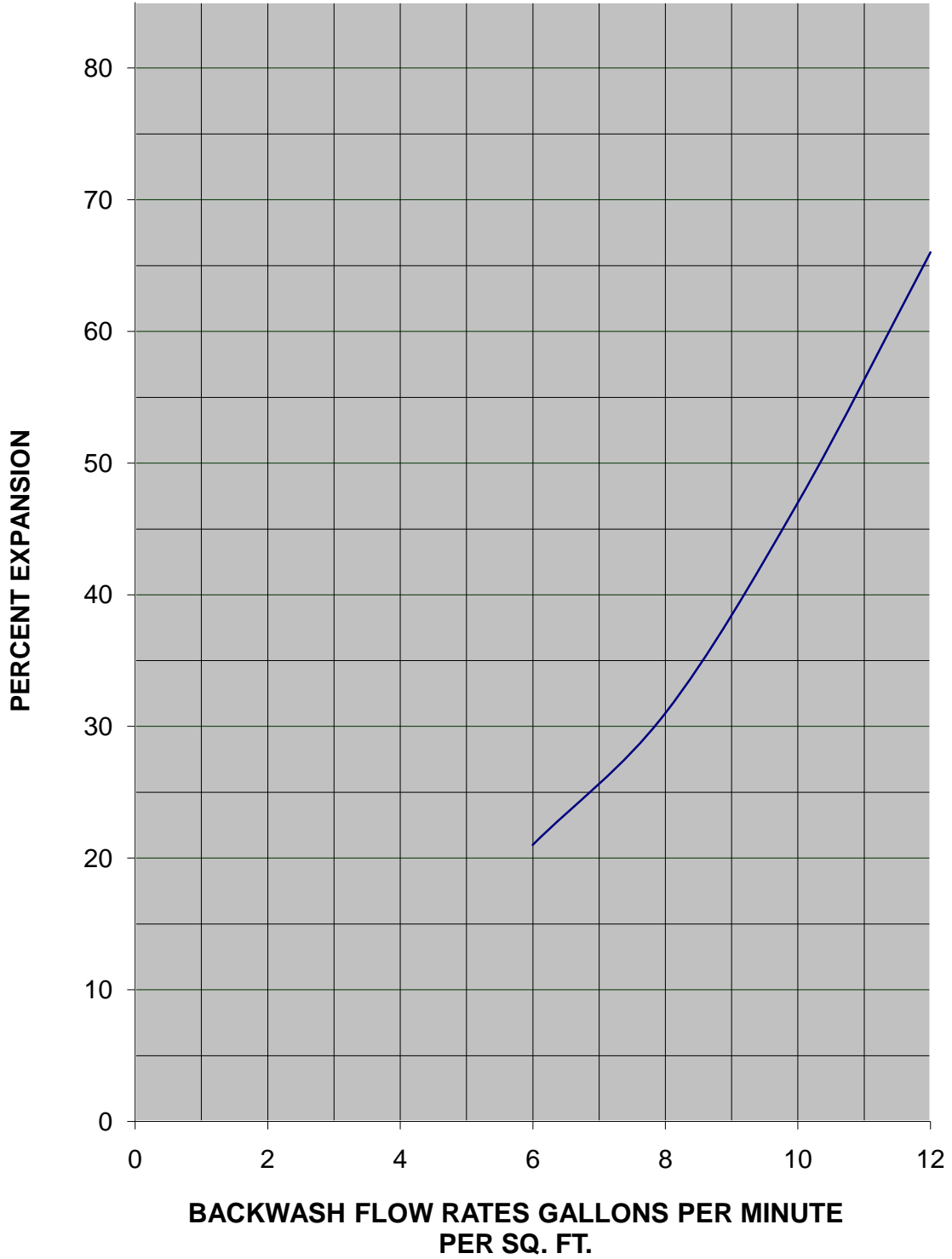
Hardness as CaCO<sub>3</sub> - Up To 17,000 Grains, (Depending on Unit Efficiency)  
10 P.P.M. of Iron or Manganese = 1 G.P.G. Hardness  
8 P.P.M. of Sodium – 1 G.P.G. Hardness

## ZEOLITE SIZE SPECIFICATION

U.S. Standard (Mesh Dry)	Sample Weight	% Retained	% Retained (Spec.)
8	000.59	.59	1% Maximum
12	29.92		
16	40.15		
20	16.74		
30	9.13		
40	2.05	97.99	92% Minimum
50	.91	.91	5% Maximum
Pan	.51	.51	3% Maximum
Total	100.00	100%	

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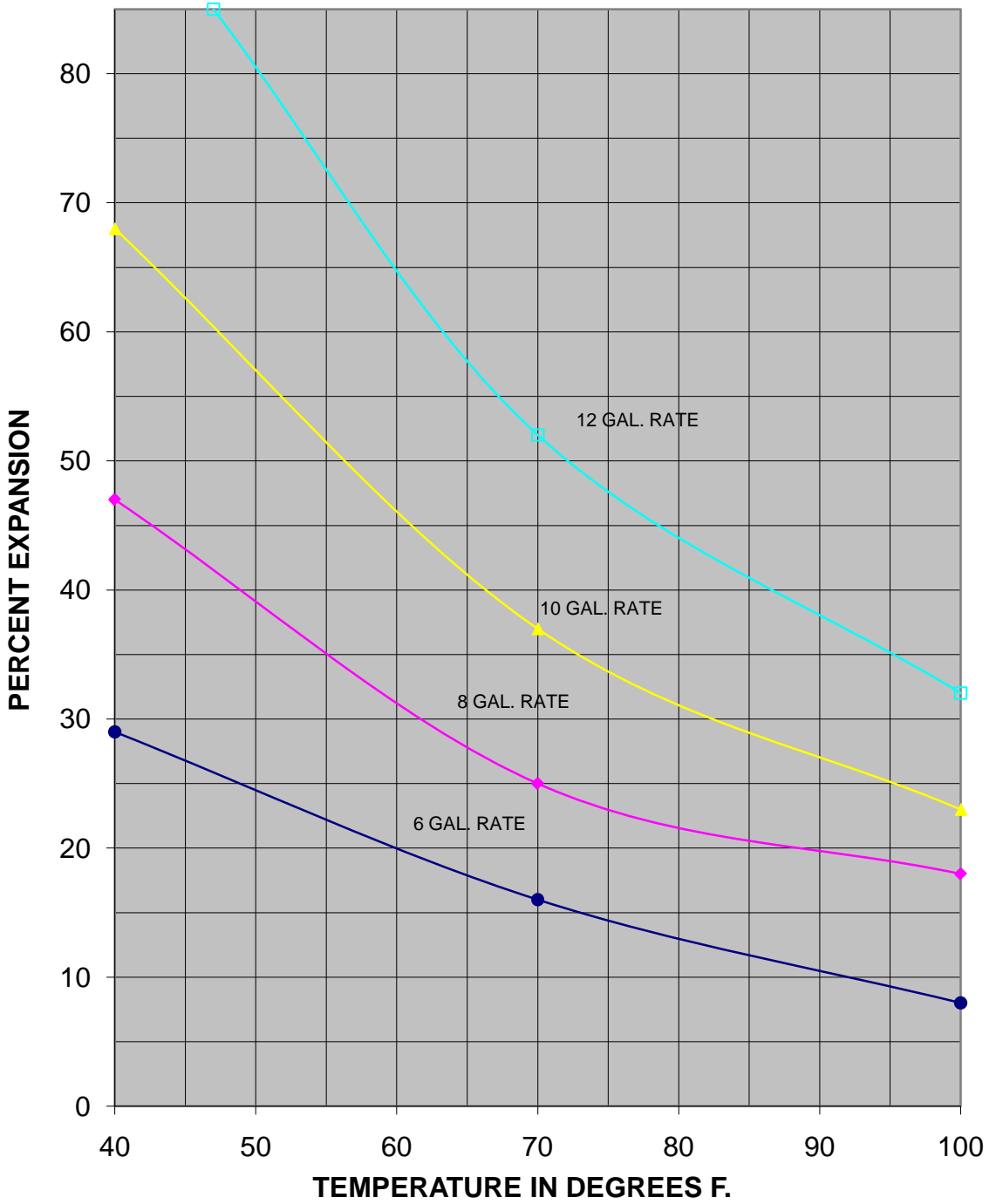
## BACKWASH EXPANSION CHARACTERISTICS @ 58°F.



# CR-100

## BACKWASH EXPANSIONS CHARACTERISTICS AT VARIOUS TEMPERATURES

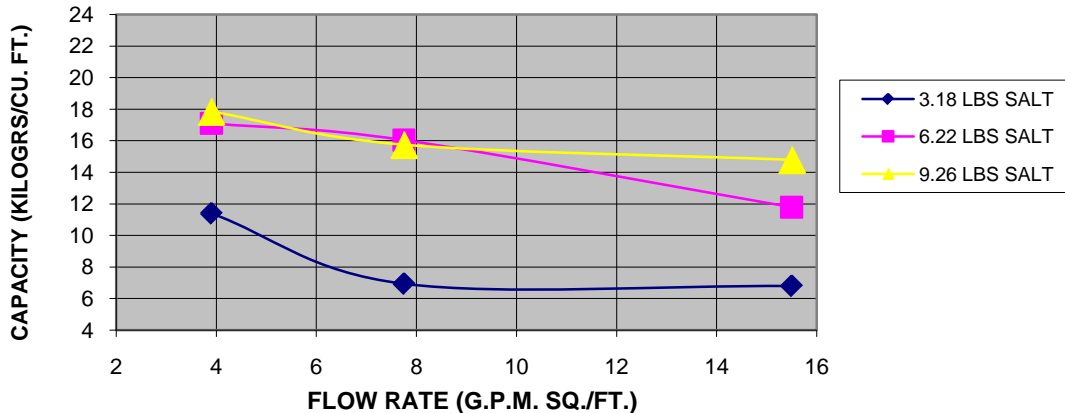
Flow Rates in Gallons Per Minute Per Sq. Ft.



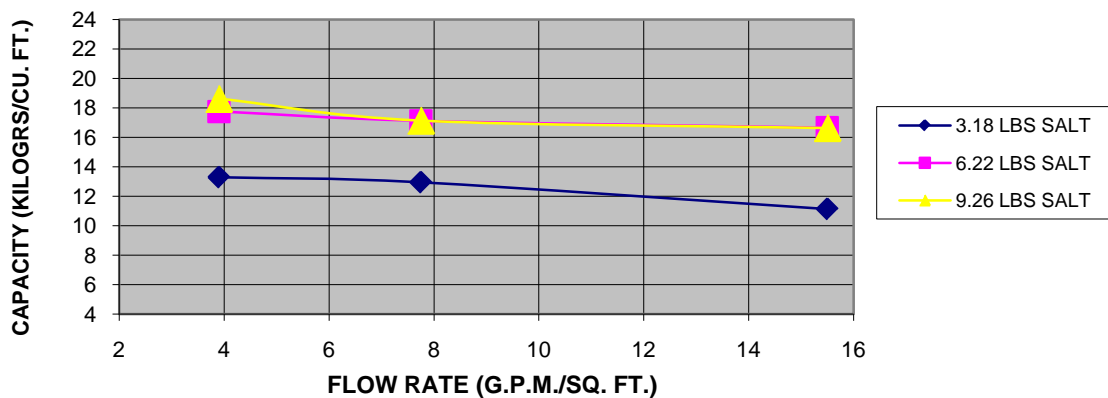
# CR-100

## CAPACITY vs FLOW RATE FOR SEVERAL LOADINGS

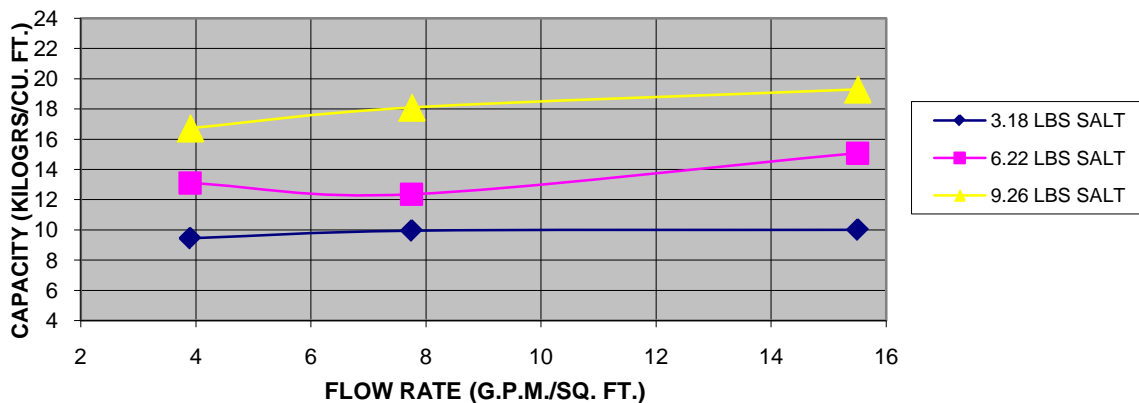
**HARDNESS 18 GRS / pH = 7.3**



**HARDNESS 9 GRS / pH = 6.0**

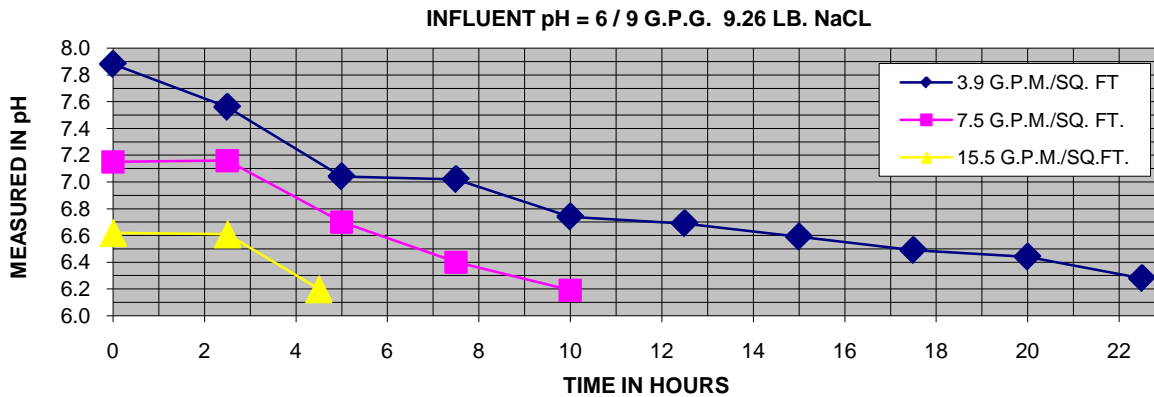
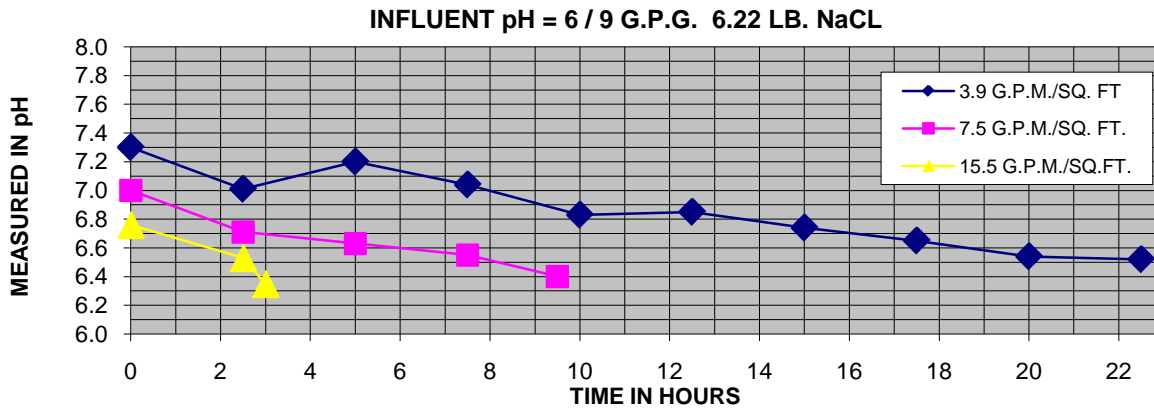
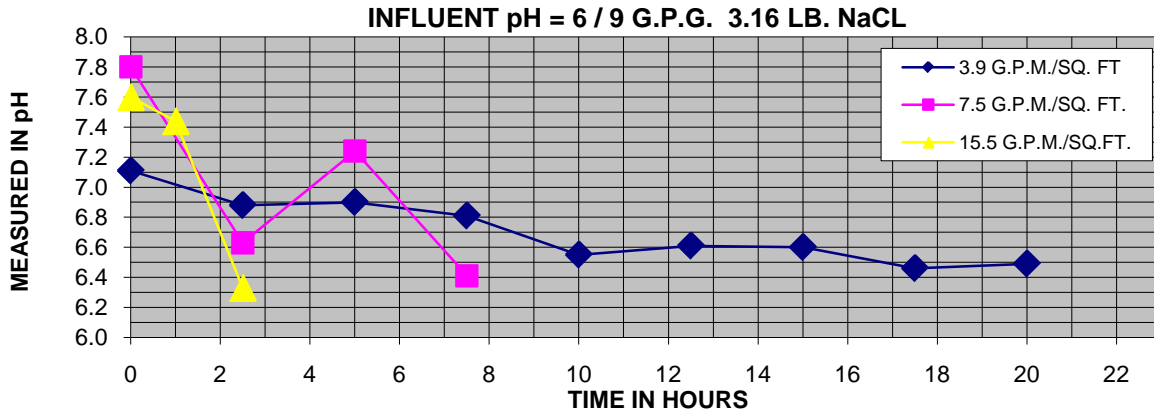


**HARDNESS 4.5 GRS / pH = 5.0**



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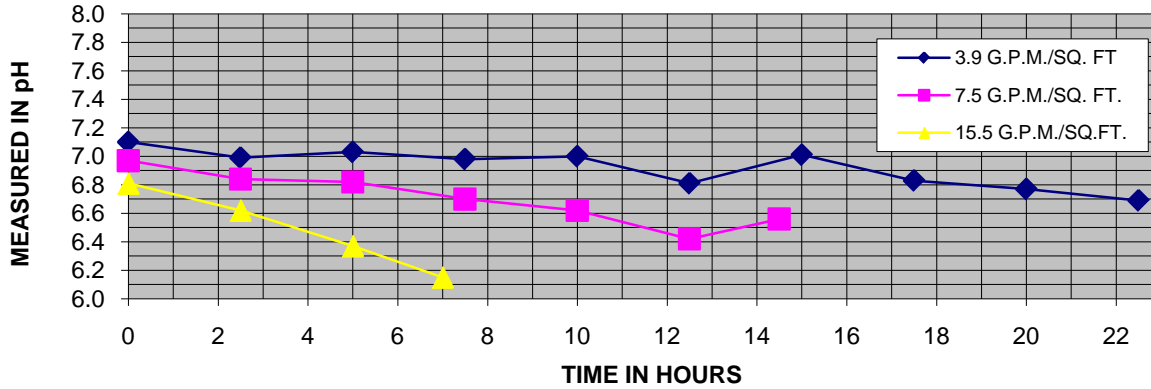
## ACID NEUTRALIZATION



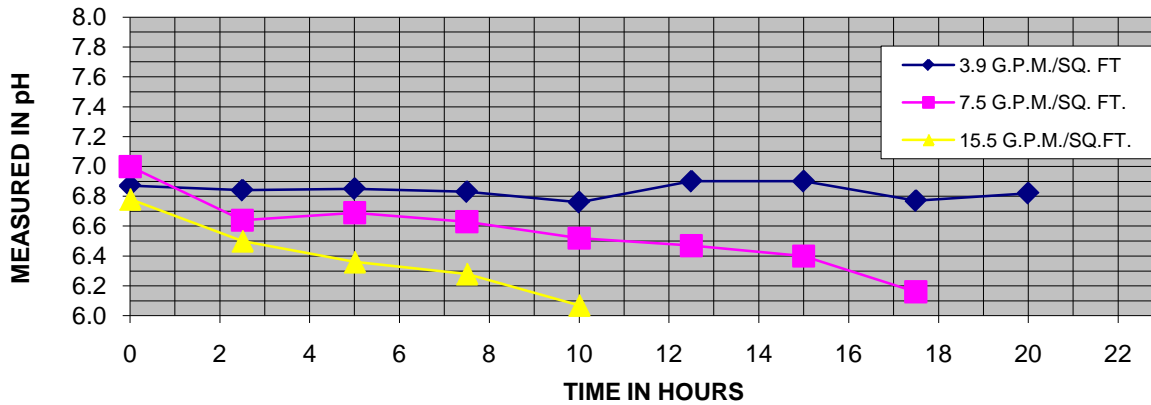
# CR-100

## ACID NEUTRALIZATION

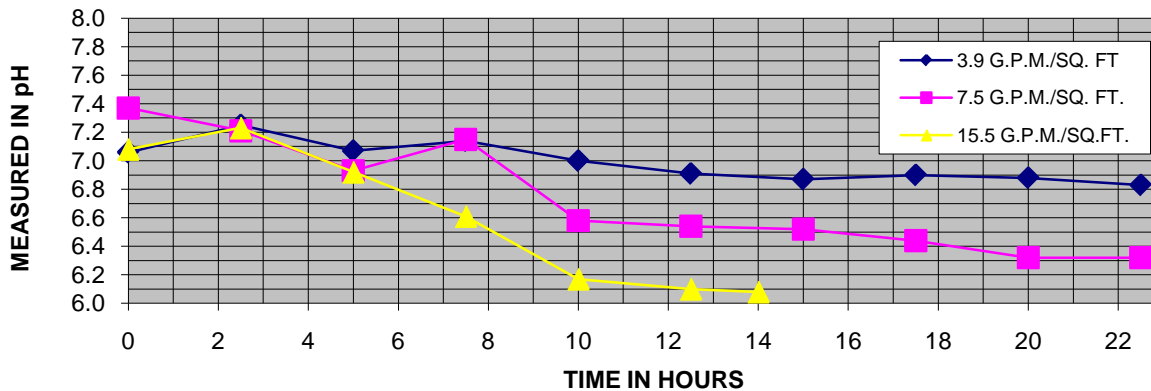
**INFLUENT pH = 5 / 4.5 G.P.G. 3.16 LB. NaCL**



**INFLUENT pH = 5 / 4.5 G.P.G. 6.22 LB. NaCL**



**INFLUENT pH = 5 / 4.5 G.P.G. 9.26 LB. NaCL**



**Flow Rate Calculations Based upon the following Information**

**CR-100 Media**

**Quantity of media**

1.0 cu. Ft.

**Depth of Bed**

23.3 inches

**Surface area**

0.5454 sq. ft.



**Mineral-Right, Inc.**

<b>CR-100</b>	
gym/sq.ft	psi
3.67	0.18
7.33	0.35
11	0.56
14.67	0.8
18.33	1.06
22	1.36
25.67	1.69
29.34	2.05
33	2.45
36.67	2.87
40.34	3.32
44	3.81
47.67	4.32
51.34	4.87
55	5.45

**CR-200 Media**

**Quantity of Media**

1.0 cu. Ft.

**Depth of Bed**

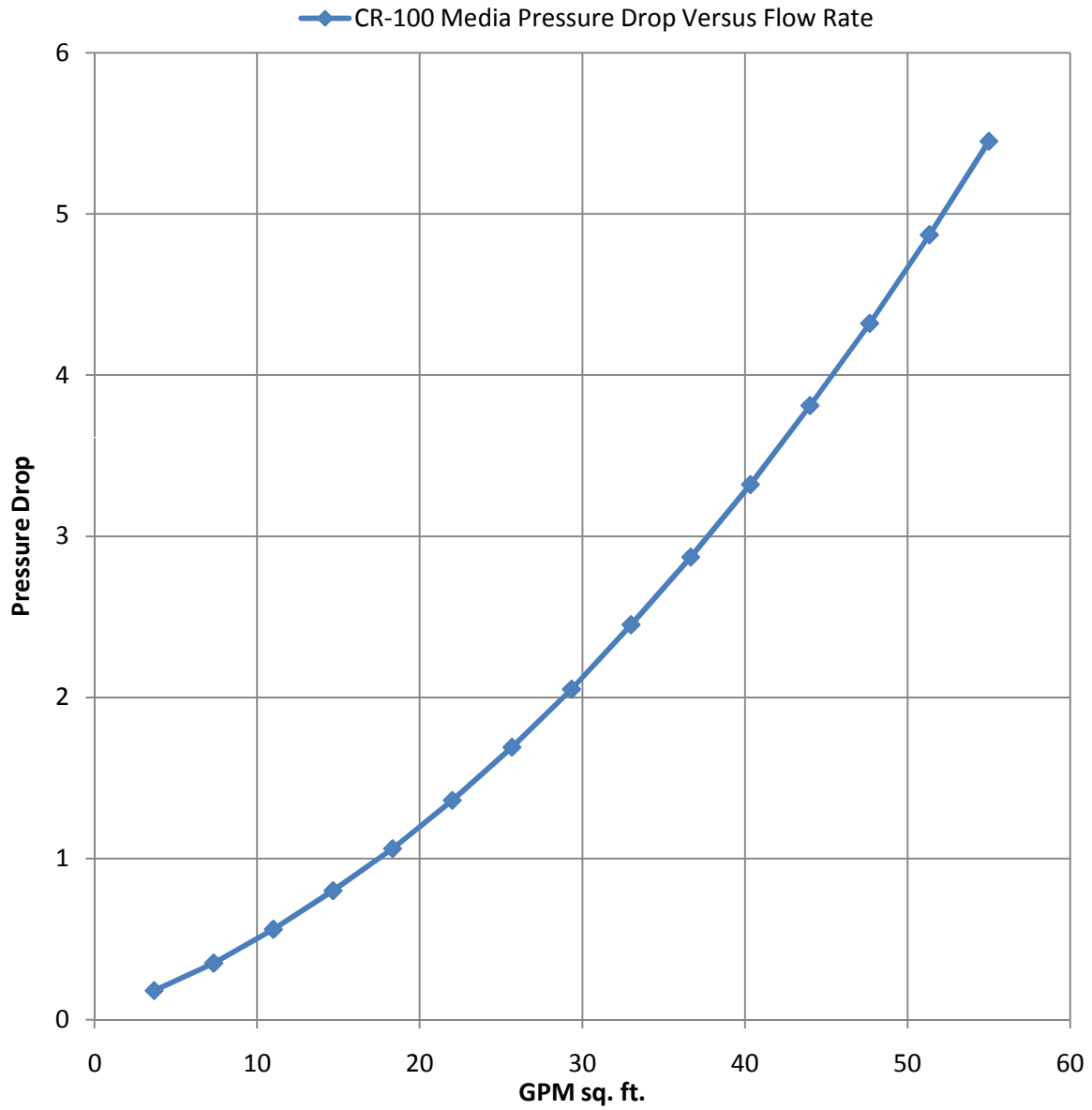
23.3 inches

**Surface area**

0.5454 sq. ft.

<b>CR-200</b>	
gpm/sq.ft	psi
3.67	0.31
7.33	0.66
11	1.03
14.67	1.42
18.33	1.82
22	2.24
25.67	2.68
29.34	3.13
33	3.59
36.67	4.08
40.34	4.58
44	5.09
47.67	5.62
51.34	6.17
55	6.73

### CR-100 Media Pressure Drop Vs Flow Rate





# CR-100 AND CR-200 SYNTHETIC ZEOLITES

Listing Under NSF/ANSI Standard No. 61



Tested and Certified by WQA  
against NSF/ANSI 61 for  
material safety only.

NSF/ANSI-61 International Standard for Drinking Water Additives

NSF/ANSI-61 Drinking Water System Components - Health Effects

This Standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This Standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water systems products, components, or materials.

Drinking Water Treatment Products certified to NSF/ANSI 61 have not been tested or evaluated for contaminant reduction performance. Contaminant reduction testing and certification claims shall be evaluated via the industry's residential drinking water treatment standards.

## INTRODUCTION:

American founder of a water treatment company. In 1936, Emmett J. Culligan launched the Culligan Zeolite Company (Water Softening) in Northbrook, Illinois. During WW II, Culligan built a facility to manufacture silica gel, a dehydrating material that protected metals from atmospheric corrosion that was greatly in demand during the war, and Culligan soon became one of the largest suppliers. He developed a novel process for manufacturing zeolite, the man-made mineral used in water softeners, and built a nationwide service industry in water conditioning and filtering, which then expanded internationally.

This synthetic zeolite has been used in water softening applications for nearly seven decades and is currently being manufactured by Mineral Right, Inc. at Phillipsburg, KS. Many models in the current softener line Water Right, Inc., Appleton, WI also incorporate the zeolite.

Toxicology of sodium aluminosilicate has been GRAS (generally regarded as safe) designated by Food and Drug Administration (FDA, 21 CFR 182.2727)<sup>1</sup>. The CR-100 and CR-200 zeolites have numerous applications in treating water and as FT-511P has recently received orphan-drug designation by the FDA as an ingested medical treatment for chronic hepatic encephalopathy secondary to end stage liver disease.

Two versions of the Mineral Right synthetic zeolite are being presented for NSF/ANSI Standard No. 61 approval. The CR-100 and CR-200 are essentially identical except for the minor variation in  $\text{Na}_2\text{O}:\text{Al}_2\text{O}_3:\text{SiO}_2$  ratios. The change in ratios increases pH stability with a slight decrease capacity.

<sup>1</sup> See FDA letter in Appendix A

### Description of the zeolite media

#### Names

**Chemical name:** sodium aluminosilicate

#### Structural Formula and Molecular Weight

CR-100 and CR-200 sodium aluminosilicates are, chemically inert, cage-like, tectosilicates in which silicon and aluminum atoms are covalently bonded in tetrahedral arrangements forming pores and channels that permit the non-covalent binding of water and metallic cations. This property is commonly used for ion exchange of hardness and iron in the field of water conditioning.

**Molecular Weight:** CR-100: 1,523 (hydrated), 1,109 (anhydrous)

CR-200: 632 (hydrated); 524 (anhydrous)

## **Physical and Chemical Characteristics**

### **Appearance**

White-light gray crystals

**Specific Gravity** The specific gravity of the synthetic zeolite at 22°C is 0.686.

### **Pore Size**

Approximately 100 Å

**MATERIAL SAFETY DATA SHEET  
FOR ZEOLITE  
MANUFACTURED BY MINERAL-RIGHT, INC.  
Revised 3/22/95**

**Chemical Name:** Sodium Alumina Silicate (Zeolite) **CAS # 12141-46-7**

**Trade Name:** Crystal-Right Silica Crystals (CR-100, CR-200, MR1, MR2, MR3, MR6, MR7, Odor-Z-Way)

**Formula:**  $[(\text{AlO}_2)_x(\text{SiO}_2)_y\text{H}_2\text{O}]$

	Percent	TWA <sup>3</sup>	RCRA
<b>1. Ingredients:</b> Hydrated Alumina - CAS# 1344-28-1	21%	15. mg/m <sup>3</sup>	N/A
Sodium Silicate - CAS# 134409-8	68%	N/A	N/A

**2. Physical Data:**

Physical State - Solid  
Physical Form - Granular Crystals  
Evaporation Rate (H<sub>2</sub>O=1) - N/A  
Specific Gravity (H<sub>2</sub>O=1) - .80/Cu. Ft.  
Vapor Pressure (mm Hg.) - N/A  
Vapor Density (Air =1) - N/A  
Solubility - Insoluble  
Boiling Point - N/A  
Appearance - White/Opaque Granular Crystals  
Odor - Neutral  
pH - 7-10

**3. Fire and Explosion Hazard Data:**

Flash Point - N/A  
Flammable Limits - N/A  
Extinguishing Media - N/A  
Special Fire Fighting Procedures - N/A

**4. Reactivity Data:**

Stability - Stable  
Conditions to Avoid - N/A  
Material to Avoid - N/A

**Continued Page 2**

**MSDS - Zeolite - Crystal-Right Silica Crystals**  
**Page Two**

**5. Health Hazards:**

Eyes - Solid or dust may cause irritation or corneal injury due to mechanical action.

Skin - N/A

Ingestion - Non-toxic

Inhalation - N/A

Systemic and Carcinogenicity - N/A

**6. First Aid:**

Flush eyes and skin with running water if signs of irritation appear.

**7. Environmental Protection Procedures:**

Conventional housekeeping methods, handle similar to earth.

No special protection needs to used when handling this product.

This information herein is given in good faith, but no warranty, express or implied, is made.  
Consult Mineral-Right, Inc. for further information.