

# The Most Advanced Salt-free Scale Prevention Media

## **FILTERSORB® SP3**



- NSF 61 Certified
- No Chemicals
- No Regeneration
- No Back wash
- No Valve
- No Electricity
- No Maintenance



**Watch® GmbH**  
A Water Company

The leading manufacturer of water filtration medias and systems



## Table of Contents

<b>Introduction</b> .....	<b>3</b>
<b>Description of FILTERSORB SP3 Scale Prevention</b> .....	<b>3</b>
Working Principle .....	<b>3</b>
Nucleation Assisted Crystallization .....	<b>4</b>
<b>The story behind pH stabilization</b> .....	<b>5</b>
<b>Why FILTERSORB SP3 is THE BEST ?</b> .....	<b>5</b>
<b>Advantages of FILTERSORB SP3</b> .....	<b>6</b>
<b>Technical Data</b> .....	<b>6</b>
<b>How much of FILTERSORB SP3 to use ?</b> .....	<b>7</b>
<b>TEST KIT</b> information .....	<b>8</b>
<b>Applications of FILTERSORB SP3</b> .....	<b>9</b>



## Introduction

**FILTERSORB<sup>®</sup> SP3** is the result of deep research work along with its undisputable success in the market, worldwide.

**Watch<sup>®</sup>**'s core motivation for developing this product was to find a true replacement for the conventional sodium based water softeners, ion-exchange resins or other chemicals, those are either partially functional or functions at the cost of the environment & health. Increased sodium content in water or decreased pH factor (making water acidic) directly influence the health problems, environmental damage and damage to the systems those are vulnerable to chemical corrosion due to sodium.

Recent restrictions upon many softeners eventually leads to an environment friendly, cost effective true solution for water softening, Watch<sup>®</sup>'s **FILTERSORB<sup>®</sup> SP3**.

To preserve the title "**No. 1**" in hard water treatment, **Watch<sup>®</sup>** has also developed a **field demonstration unit** with the **TEST KIT**, that actually no other softening medias can offer, to prove the performance of the media on site, in less than 4 minutes time.

## Description of FILTERSORB<sup>®</sup> SP3 Scale Prevention:

- **FILTERSORB<sup>®</sup> SP3** completely takes care of the primary Scale forming cations viz. **Ca<sup>2+</sup>** and **Mg<sup>2+</sup>**.

### Working Principle:

When the hard water under goes nucleation in the pressure vessel, the calcium bicarbonate  $\text{Ca}(\text{HCO}_3)_2$  is transformed in aragonite form of calcium carbonate  $\text{CaCO}_3$  crystals. These crystals are formed through decomposition and crystallization process, forming very stable harmless crystals.

The following equation describes the reaction that occurs inside the pressure vessel when flow over grains of nucleation.



- The name fragment "**SP(Scale Prevention) 3**" is to indicate this unique transformation of water hardness  $\text{Ca}(\text{HCO}_3)_2$  into **3** components viz. **1.**  $\text{CaCO}_3$  (micro-crystals) **2.**  $\text{CO}_2$  (colloid) and **3.**  $\text{H}_2\text{O}$  (pure)

In the pressure vessel, the equilibrium of carbonate species in water is shifted, assisted by the driving force of stable crystal formation and therefore the reaction is pushed to the right. With this technology, as long as  $\text{CO}_2$  is being removed the soluble  $\text{Ca}(\text{HCO}_3)_2$  converts into insoluble calcium carbonate ( $\text{CaCO}_3$ ) crystals.

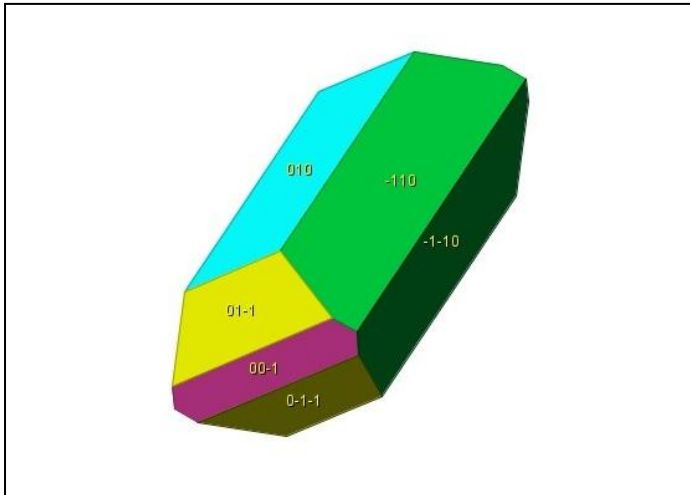
The calcium carbonate crystals grow steadily. They are **very stable** and **cannot dissolve** (incapable of forming scale) in the water.

Glass grains crystallization sites provide **increased nucleation sites** for the formation of submicron sized  $\text{CaCO}_3$  crystals. Hence this amazing process is called **Nucleation Assisted Crystallization** or **(NAC)** in short.

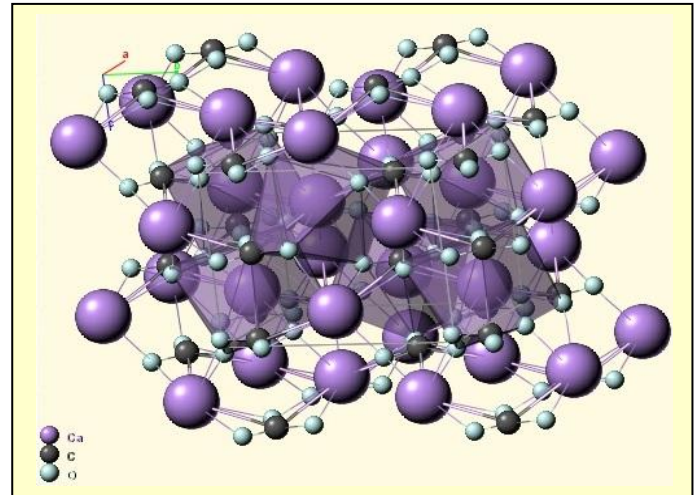


## Nucleation Assisted Crystallization (NAC)

Once formed and detached from the surface of **FILTERSORB® SP3** media beads, the crystals will not adhere to any other surfaces, even in the case of hot water applications. The aragonite crystals cant form scale because of its stable molecular structure and neutral surface electro potentiality.



Stable Aragonite Crystal structure



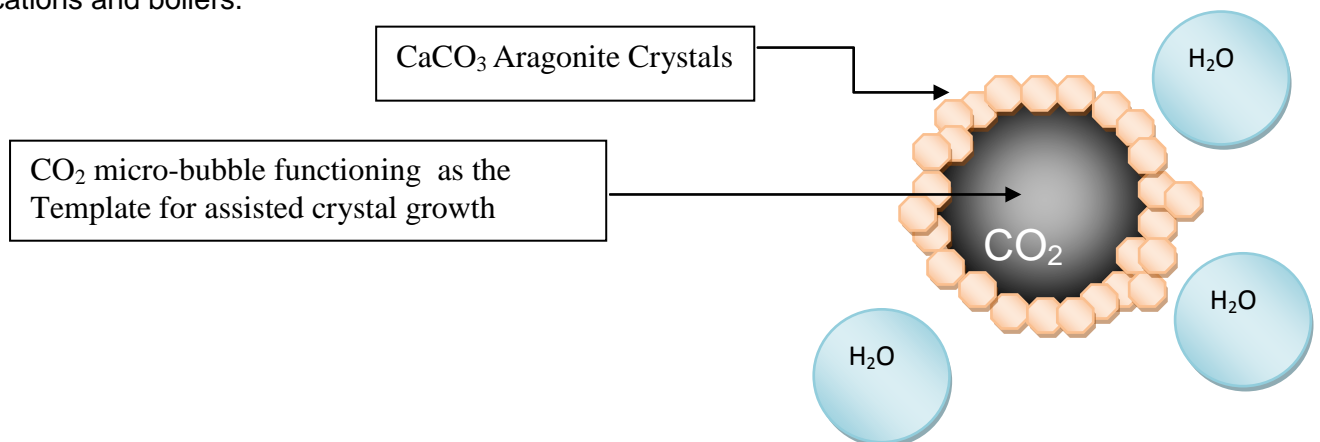
Aragonite Crystal Molecular structure

Nucleation Assisted Crystallization is the basis of **reliable Scale Prevention capability** of **FILTERSORB® SP3**.

The transformation of water hardness takes place in the following steps:

1. Continuous transformation of water hardness makes the immediate crystal growth possible with unidirectional chemical equilibrium viz.  $\text{Ca}(\text{HCO}_3)_2 \rightarrow \text{CaCO}_3 + \text{CO}_2 + \text{H}_2\text{O}$   
As  $\text{CO}_2$  leaves fast the right hand direction of the equation is preserved.
2. The crystals developing on the surface of the **FILTERSORB® SP3** bead, grow rapidly and nucleate using the formed  $\text{CO}_2$  micro-bubbles (colloid gas) as the template.
3. After a certain period of time the micro-emulsion of  $\text{CO}_2$  &  $\text{CaCO}_3$  forms hollow particle & leaves the media bead surface in neutral form. The average dimension of  $\text{CaCO}_3$  crystal coated globules ranges in micro-meter. The noted reaction time is normally less than 4 seconds.

**FILTERSORB® SP3** formed crystals can sustain a temperature up to  $380^\circ\text{C}$ , before structural breakdown to calcite form. This property of the transformed hardness makes the treated water perfect for hot water applications and boilers.





### Micro Crystals and Colloid CO<sub>2</sub>

## The story behind amazing pH stabilization of FILTERSORB<sup>®</sup> SP3 treated water

Influence of formed CaCO<sub>3</sub> as pH balancing factor:

- The reaction:  $\text{Ca}(\text{HCO}_3)_2 \rightarrow \text{CaCO}_3 + \text{CO}_2 + \text{H}_2\text{O}$  is unidirectional while SP3 is transforming the hardness into water insoluble crystals.
- In nucleation assisted crystallization process formed CO<sub>2</sub> leaves as **colloid gas** and is used as the template by the rapidly growing crystals in the nucleation site.
- This emulsion of CaCO<sub>3</sub> micro-crystals & CO<sub>2</sub> micro-bubbles forms hollow particles
- Formed hollow particles are double walled, both internal and external faces belonging to the cleavage aragonites which **separate the surrounding water from the enclosed gas cavity.**
- Hence, the reverse reaction of CO<sub>2</sub> with water forming Carbonic Acid is not possible and the **pH stability is maintained.** In fact every excess CaCO<sub>3</sub> crystals are buffering any carbonic acid left over.

## Why FILTERSORB<sup>®</sup> SP3 is the BEST ?

Some serious points are mentioned here about the credibility of the media.

- **TEST KIT:** It has the **TEST KIT** available, that helps one to see the performance of this unique scale prevention media in his own eyes within 3-4 minutes, right on the test site. Watch has also developed the portable demonstration unit to perform live demonstrations.
- **No TDS change:** As FILTERSORB<sup>®</sup> SP3, does not take out or give in anything in the water. As no ion-exchange chemistry is used the **TDS** of the water remains unchanged before and after the treatment.
- **No pH change:** pH of the water remains same. This factor makes the treated water suitable for almost any use where corrosion is concerned.
- **Rich Minerals Preserved:** FILTERSORB<sup>®</sup> SP3 does not add up sodium or any chemicals in the water. It simply preserves the Calcium and Magnesium contents of water, making the treated water the healthiest mineral water available. These Calcium and Magnesium are quintessential for nervous systems & muscles functionalities. They are indispensable parts in the cell chemistry of the plants and most of the life forms on earth.
- **De-Scaling:** Not only FILTERSORB<sup>®</sup> SP3 prevents scale formation in water channels, but it also helps to reduce the previously formed scales. The **NAC** process takes out water dissolved CO<sub>2</sub> in almost-visible micro-bubbles forms that helps reducing previously formed scale over a period of time (depends on the usage period).
- **Biocides:** **NAC** process creates the conditions that water dissolved CO<sub>2</sub> agglomerate to form micro-bubbles. These CO<sub>2</sub> bubbles actively destroys bacterial membranes acting as a biocide. So along with the scale prevention FILTERSORB<sup>®</sup> SP3 also helps **preventing Biofouling.**



**Advantages of FILTERSORB® SP3 :**

- No salts required.
- No back-washing required.
- No regeneration cycle required.
- No increase in sodium content in water.
- Cleans the previous scales of plumbing.
- Catalytic process converts **Ca** and **Mg** into harmless micro crystals.
- Maintenance free. No extra cost incurred.
- No chemicals required for disinfection.
- No electrical connections required.
- No drain connections required.
- No control valves required.
- Very easy to instal.
- Very healthy water.

**Technical Data:**

Characteristics	
Appearance	White granules
Composition	Ceramic modified polymer
Bulk weight (g/L)	0,80
Particle size (mm)	0,55-0,75
Change in volume	up to 60%
Moisture content	10-25%

Operational parameters & water impurities	
Operating temperature (°C)	3 to 90
pH range	6.5 to 9.5
Hardness, max. ppm	1400
Salinity, max. ppm	35000
Iron, max. ppm	0.2*
Manganese, max. ppm	0,05
Free chlorine, max. ppm	3
Copper, max. ppm	1,3
Oil	free
Hydrogen sulfide	free
Phosphates	free

**Lifespan of the Media:**

The effective average lifespan of **FILTERSORB® SP3** is 3 to 5 years, depending on the water conditions.



### How much FILTERSORB® SP3 to use?

Watch® recommends to use **3 liters** of FILTERSORB® SP3 to treat temporary hardness up to 450 ppm at the flow rate of 1 m<sup>3</sup>/h. In theory FILTERSORB® SP3 can treat **any level** of temporary hardness depending on the system design and flow rate control.

**Water total hardness is calculated in respect with equivalent CaCO<sub>3</sub> hardness.**

The Pressure Vessel volume should be 6 to 7 times of the volume of the media. The flow-rate chart is given below:

Required FILTERSORB® SP3	Water hardness (CaCO <sub>3</sub> equivalent)					
	upto 450ppm		450ppm - 900ppm		900ppm - 1340ppm*	
	liter	m <sup>3</sup> /hr	lpm	m <sup>3</sup> /hr	lpm	m <sup>3</sup> /hr
1	0,33	5,50	0,17	2,83	0,11	1,83
2	0,67	11,17	0,33	5,50	0,22	3,67
3	1	16,67	0,5	8,34	0,33	5,50
4	1,33	22,17	0,67	11,17	0,44	7,33
5	1,67	27,84	0,83	13,84	0,56	9,34
6	2	33,34	1	16,67	0,67	11,17
7	2,33	38,84	1,17	19,50	0,78	13,00
8	2,67	44,51	1,33	22,17	0,89	14,84
9	3	50,01	1,5	25,01	1	16,67
10	3,33	55,51	1,67	27,84	1,11	18,50
11	3,67	61,18	1,83	30,51	1,22	20,34
12	4	66,68	2	33,34	1,33	22,17
13	4,33	72,18	2,17	36,17	1,44	24,00
14	4,67	77,85	2,33	38,84	1,56	26,01
15	5	83,35	2,5	41,68	1,67	27,84
16	5,33	88,85	2,67	44,51	1,78	29,67
17	5,67	94,52	2,83	47,18	1,89	31,51
18	6	100,02	3	50,01	2	33,34
19	6,33	105,52	3,17	52,84	2,11	35,17
20	6,67	111,19	3,33	55,51	2,22	37,01
21	7	116,69	3,5	58,35	2,33	38,84
22	7,33	122,19	3,67	61,18	2,44	40,67
23	7,67	127,86	3,83	63,85	2,56	42,68
24	8	133,36	4	66,68	2,67	44,51
25	8,33	138,86	4,17	69,51	2,78	46,34
26	8,67	144,53	4,33	72,18	2,89	48,18
27	9	150,03	4,5	75,02	3	50,01
28	9,33	155,53	4,67	77,85	3,11	51,84
29	9,67	161,20	4,83	80,52	3,22	53,68
30	10	166,70	5	83,35	3,33	55,51
31	10,33	172,20	5,17	86,18	3,44	57,34
32	10,67	177,87	5,33	88,85	3,56	59,35
33	11	183,37	5,5	91,69	3,67	61,18
34	11,33	188,87	5,67	94,52	3,78	63,01
35	11,67	194,54	5,83	97,19	3,89	64,85
36	12	200,04	6	100,02	4	66,68

\* Please consult us to treat Hardness over 1340 ppm



### TEST KIT:

Watch has developed the **TEST KIT** for instance demonstration of the media performance. Only we offer the opportunity to test out the media performance on site in less than 4-5 minutes preparation time. Nobody else can demonstrate their anti-scale media performance like us.

The Watch Water "Clear Yellow" hardness test kit was designed to give customers a way to test the performance of **FILTERSORB® SP3**. The "Clear Yellow" hardness test kit can be used to test naturally hard water in comparison to water treated by **FILTERSORB® SP3**, competitor scale control medias and other methods of scale prevention technologies such as electronic systems, magnetic systems and audio frequency systems. Side by side comparison will show that the technologically advanced processes unique to **FILTERSORB® SP3** are far superior to all other scale prevention technologies on the market today.

### Easy To Use, Results in 3 Minutes or less!

All you need for testing is two (or more) bottles for storing and comparing test water. One will contain water treated by **FILTERSORB® SP3**. Additional bottles will contain an alternate source of water for comparison, such as naturally hard water or water treated by other methods of scale prevention such as electronic systems, magnetic systems, or audio frequency systems. Aside from the test bottles all you need is the Watch Water "Clear Yellow" testing reagent. That's all !!

### Directions For Use:

1. Check to make sure test bottles contain Watch Water "Clear Yellow" testing reagent.
2. **FILTERSORB® SP3** treated water test bottle preparation – First, turn on water and run **FILTERSORB® SP3** system for at least one minute to assure the water being tested is freshly treated water and not water that has sat stagnant in the tank for a long period of time. Fill test bottle number one, approximately 3/4 full of water treated by **FILTERSORB® SP3**. Do not fill the test bottle all the way up. You will be shaking the bottle to mix the water and the reagent, so you need to leave enough room in the bottle so that it can be shaken and mixed well.
3. Comparison water test bottle preparation - Fill test bottle number two approximately 3/4 full (same as test bottle one) of naturally hard water or water that has been treated by an alternate source of scale prevention such as an electronic system, a magnetic system, or an audio frequency system.
4. Screw the caps closed on the test bottles to assure a water tight seal.
5. Shake bottles thoroughly for a minimum of 5 seconds or until the **FILTERSORB® SP3** "Clear Yellow" testing reagent is completely dissolved.
6. Unscrew both bottle tops and wait a few minutes (1-5 minutes depending on water quality) to view testing results.
7. Bottle number one, containing water treated by **FILTERSORB® SP3**, will show no signs of precipitation. The water will show no cloudiness and be "clear yellow" in color.
8. Bottle number two, containing comparison water, will show significant precipitation. The water will be cloudy and dirty yellow in color. As the bottles sit, you will notice the accumulation of hardness/turbidity and the bottom of test bottle number two. The bottle containing water treated by **FILTERSORB® SP3** will show no signs of this precipitation because it has been completely eliminated by **FILTERSORB® SP3**. Once testing is complete, dispose of test water from both bottles.

**Please Note: The yellow color added for testing is simply food coloring added for testing purposes to make the hardness/turbidity easier for you to see. This yellow color will not appear normally in water treated by FILTERSORB® SP3.**





## Applications:

**Home appliances:** Faucets, water pipes, shower heads, shower cabins, toilets. All beverage systems, kitchen machines, dish washers, ice cubes, compact washers and dryers.

**Major appliances:** Central heating, air conditioners, water heaters, air humidifiers, coffee and tea makers, solar heating systems, water coolers.

**Boilers:** Hot water boilers, central heating boilers, combi boilers, catering water boilers, boilers and pool heaters, commercial water heaters, industrial hot water boilers.

**Cooling towers:** Closed circuit cooling towers, open circuit cooling towers, concrete cooling towers, cross flow cooling towers.

## Commercial References:

Hydro Electricity, Winery, Car Washing, Dairy Processing, Food & Beverages, Injection Molding, Agriculture, Nurseries, Reverse Osmosis pre-treatment etc.

Practically **FILTERSORB<sup>®</sup> SP3** Systems can be installed anywhere where Scale Prevention is concerned. It's unique working method, cost effectiveness, ease of design & remarkable non-chemical properties makes **FILTERSORB<sup>®</sup> SP3** the ultimate choice for both residential and commercial applications.

**Watch<sup>®</sup>** is the manufacturer of the scale prevention media **FILTERSORB<sup>®</sup> SP3** and the System **SOFT NO R<sup>®</sup>**.

**Interested Distributors/Customers are requested to contact us directly.**

For detailed literature please visit our website: <http://filtersorb3.de>

If you have any questions or need assistance please contact us:

**Contact Person** Mr. Gairik Adhikary  
**Telefon:** +49 (0) 621 87951-53/54  
**Telefax:** +49 (0) 621 87951-99  
**Email:** gairik@watchwater.de  
**Our Address:** **Watch<sup>®</sup> GmbH**  
Fahrlachstr. 14  
68165 Mannheim  
Germany