BoreSaver Ultra C – Instructions For Use

Product Description

BoreSaver Ultra C is a powerful rehabilitation product that dissolves iron oxide deposits in potable groundwater bores, wells, pumps and pipes.

Certified to NSF/ANSI 60

Overview

BoreSaver Ultra C is added to the target treatment zone directly from the container and then agitated using standard well rehabilitation methods. This loosens and dissolves the clogging that can then be removed by bailing, airlifting or pumping.

Safety & The Environment

BoreSaver Ultra C contains natural and organic ingredients and is fully and rapidly biodegradable.

Being a concentrated product, care should be taken in handling both the product and the purge water. Avoid contact with skin and eyes and keep out of reach of children. Do NOT consume the cleaner or the purge water. When the well is for potable use purge and chlorinate as per the instructions.

Treatment Method Overview

Key s to a successful clean:

- Use the recommended amount of product.
- You should do two treatments for a really severe clogging problem rather than increasing the treatment concentration beyond the recommended maximum 5%.
- Get the product to the area that needs it. If the well has more than 260 feet of water depth it may be useful to use a tremmie to get product directly into the screens.
- Agitate the treatment solution thoroughly in the target zone. This really helps get the best results!
- Leave the cleaner in place for the recommended time.
- After the treatment solution has been purged, chlorinate the well in the usual manner. See appendix 1 for a field guide.

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- **Ensure all wastewater is disposed of in accordance with relevant Environment Agency protocols. Often this is simply on the ground.**

Applying The Product

BoreSaver Ultra C is supplied as a concentrate and can be used "as is" or mixed with potable water just prior to use if required.

In wells with up to 260 feet of water depth the product can simply be tipped into the top.

It takes approximately 20 minutes for the crystals to reach 200 feet of water depth and a further 10 minutes to reach the 260 feet mark.

Subsequent surging, cycling, brushing etc of the well will do a good job of mixing the product and working it into the target zones.

If the water depth is greater than 260 feet, we recommend using a tremmie system to place the product in the target zones. When we refer to a tremmie, we are describing a reel of pipe or hose with a pump attached that can place the treatment solution to a variety of depths in the well.

Where the pump is to be left in place and a cycling method of treatment used, simply start the pump running then add **BoreSaver Ultra C** into the top of the well. Please note this will efficiently clean the pump, rising main and upper sections of the casing but not have any significant impact below the pump level.

How Much To Use?

Maintenance dose rate is 2% by volume of **BoreSaver Ultra C** to the water volume in areas to be treated.

If you also wish to clean the gravel pack please double the amount in the dosing chart.

The severe section of the chart is reserved for sites with a very substantial build-up of iron oxide clogging deposits and non potable use.

Casing ID Internal Diameter	Maintenance		Severe	
	lb/foot	kg/m	lb/foot	kg/m
4"	0.12 lbs	0.13 kg	0.30 lbs	0.31 kg
6"	0.28 lbs	0.29 kg	0.70 lbs	0.72 kg
8"	0.44 lbs	0.51 kg	1.10 lbs	1.28 kg

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Simply look at the recommended amount of **BoreSaver Ultra C** required (2% or 5%) for the appropriate casing internal diameter. Multiply this amount by the water depth to be treated. i.e 30 ' water depth for a 4" ID well for a maintenance clean. 0.12 * 30 so we know we need 3.6 lb of product to do the job.

Mechanical Surging

Reversed flow through the screen into the formation can be accomplished through the use of mechanical devices such as surge block or surge plunger. Surging alternately forces water into and out of the formation through the well screen openings.

Surge Application Method

1. Pump is removed.
2. Down-hole camera determines the extent and areas of fouling.
3. brush/surge
4. Bail the well to remove loose material.
5. Add the recommended amount of **BoreSaver Ultra C** to the casing and screen.
6. Restart the brush/surge process
7. Leave the product to work in the screen for 8 to 24 hours
8. Purge 3 casing volumes or more until water runs clear (measure flow and drawdown at this time to calculate specific capacity (SC)).
9. Wastewater from the purge (including the chlorinated water) should be disposed of in accordance with Environment Agency protocols.
10. Inspect the well with a camera.
11. Repeat steps 3 to 7 if desired.
12. Once the pH of the purge water has returned to normal background levels, add a suitable chlorinating solution to the well and mix well. * see appendix 1 for chlorination guidelines.
13. Purge two casing volumes to waste (see note: 9) or until chlorine levels are acceptable. Wastewater from the purge (including the chlorinated water) should be disposed of in accordance with Environment Agency protocols.
14. Test the water pH and as otherwise may be directed by any relevant authorities.
15. Install the pump.
16. Resume operations

Air Assisted Development

Airlift pumping forces compressed air through an air-line to the bottom of the well. As the mass of air bubbles rise, they create a surging effect that carries water and

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fines out of the well. Air lift pumping is alternated with short periods of no pumping, which forces water out into the formation to help break up sand bridging around the screen. Well development is only effective if the water is deep enough in the well to get the surging action and the correct treatment chemicals are used.

Air Application Method

1. Pump is removed.
2. Use down-hole camera to determine the extent of the fouling.
3. Start the air surge process
4. Bail or airlift any debris from the well.
5. Add the recommended amount of **BoreSaver Ultra C**.
6. Resume air surge
7. Leave the product to work in the screen for 8 to 24 hours
8. Purge a minimum of 3 casing volumes or until water runs clear (measure flow and drawdown at this time to calculate specific capacity (SC)).
9. Wastewater from the purge (including the chlorinated water) should be disposed of in accordance with Environment Agency protocols.
10. Perform a camera inspection.
11. Repeat steps 3 to 7 if required
12. Once the pH of the purge water has returned to normal background levels, add a suitable chlorinating solution to the well and mix well. * see appendix 1 for chlorination guidelines.
13. Purge two casing volumes to waste (see note: 9) or until chlorine levels are acceptable.
14. Test the water pH and as directed by the Water any relevant authorities.
15. Install pump.
16. Resume normal operations

Simple Pump Cycling Method

Here we leave the pump in the hole and direct the water flows back down the well. This method is more focused on cleaning the pump than anything else. Clients will use this method most often on wells that are not over clogged or where pump removal is not feasible or for economic reasons.

Application Method

Pump head works need to be modified to allow the discharge to be directed back into the bore. This can be as simple as attaching a suitable hose. Should the flow be too great for a flexible fitting, direct the output into a tank, which then discharges back into the casing.

1. Start the pump; make sure fittings and pipes are secure.

2. Add the recommended amount of treatment product to the well.

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3. Recycle for a minimum of 8 hours preferably 12 but never more than the pump manufacturer suggests.

4. Add 26 gallons of potable water to the well.

5. Leave pump off for a period of 4 to 8 hours.

6. Start pump and purge to waste. Wastewater from the purge (including the chlorinated water) should be disposed of in accordance with Environment Agency protocols.

7. During purging, add potable water to the well to flush cleaner and reaction by-products from the areas above the pump.

8. Once the pH of the purge water has returned to normal background levels, add a suitable chlorinating solution to the well and mix well. * see appendix 1 for chlorination guidelines.

9. Purge the chlorinated water to waste taking note of the disposal guidelines in step 6.

10. Take this opportunity to perform pump (SC) and water tests.

11. Reconnect head work's and resume normal operations

Handling-Safety- Storage

Skin Protection:

Use rubber or neoprene gloves. Other protection including impervious boots, apron, or coveralls should be used as needed in areas where there is a risk of unusual exposure to prevent skin or eye contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Cautions

Chlorine type chemicals react vigorously with **BoreSaver Ultra C**.

Storage

BoreSaver Ultra C is supplied in UN certified boxes and pails. Storage should be cool, dry, well-ventilated area out of direct sunlight. Check regularly for leaks.

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Incompatibilities

Acids are highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites, and formaldehyde.

On Site Disposal of Purge Water

Purge waters contain the minerals dissolved into solution (the original "problem source" usually iron), carbon dioxide and some amount of residual acidity. Wastewater from the purge (including the chlorinated water) should be disposed of in accordance with Environment Agency protocols.

Contain the first two well volumes of the purge water onsite in a holding pit or tank for pH correction.

Adding sodium carbonate, sodium bicarbonate until pH 7 is reached will correct the pH almost instantly.

Dilute Treatment Solution/Purge Water Spills

For spills of the treatment solution and the first well volume of purge water, the emergency coordinator should be aware of the following guidelines:

1. Treatment solution concentrations are low and are well below Dangerous Goods guidelines.
2. Ensure adequate ventilation of the area.
3. Diluting the spill with baking soda or sodium carbonate will correct pH rapidly.
4. Once pH has been corrected, direct the resultant water to a suitable drain or storage for later disposal.
5. Decontaminate spill site with soap and water.
6. Allow the room plenty of time to properly air out, or use a portable fan.

Appendix 1

Table 1. Disinfection of Well with Bleach (Approximately 5.25% Hypochlorite)

Depth of water in well (m)	Volume of bleach added (5.25% chlorine)	
	Casing Diameter 15 cm Drilled well	Casing diameter: 90 cm Drilled well
1	100 mL	3.2 L
3	300 mL	9.8 L

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5	500 mL	16.5 L
10	1000 mL	32.0 L
30	3000 mL	96.0 L

* A chlorine concentration of about 250 mg/L is used for low level disinfection.
****** For large diameter bored wells the volume of chlorine can be reduced by approximately half if industrial strength chlorine (12% sodium hypochlorite) is used.

Appendix 2

CONCENTRATED ACID SPILL PROCEDURE

For acid spills, the emergency coordinator should be aware of the following guidelines:

1. Restrict access into the spill area. Consider the potential for personal exposures to the substance and decide whether the fire department should be called.

2. Check the pH. Use the MSDS or chemical manufacturer's information as a guide and then determine appropriate PPE. Evaluate the spill site carefully for electrical hazards (acids are excellent conductors of electricity).

3. Diatomaceous earth (Ultrasorb 248) may be used in all liquid spills involving acids. NOTE: Individuals with greater knowledge and expertise may consider the use of baking soda or sodium carbonate for neutralization of acid. Be aware of carbon dioxide gas formation and possible air borne contamination problems when using neutralizing acids.

4. Use a plastic shovel or dustpan to clean up the acidic residue. Collect the acidic debris in a covered plastic bucket (acidic wastes will corrode metal containers). If the acid has been neutralized with carbonate based material, DO NOT seal waste containers until the neutralization reaction ceases (carbon dioxide pressure buildup). Decontaminate spill site with soap and water.

5. Allow the room plenty of time to properly air out, or use a portable fan.

6. Properly label the waste container with a hazardous waste label including the date of accumulation. Leave a note on the waste container indicating the circumstances of the spill and notify the hazardous waste manager for final disposal.

7. Place waste container somewhere safe.

Appendix 3

General Overview of Acids

Acids have the ability to neutralize bases. In general, acid-base neutralization occurs when a hydrogen ion (H+) combines with a hydroxide ion (OH-) to produce water (H_2O). When acids are neutralized with baking soda or sodium carbonate, water and carbon dioxide gas is formed. Acids usually dissolve metals, and in the process generate flammable hydrogen gas.

Acids turn litmus RED. The pH range of acidic solutions is from 6.9 to 0. The stronger an acid, the lower the pH.

Whenever deciding to neutralize acid spills with baking soda or soda ash careful consideration must be given to the consequences of the procedure. Both baking soda and soda ash produce carbon dioxide gas (bubbles) in the neutralization process, which may cause airborne contamination problems (will also aerosolize the acid being neutralized). Baking soda dissolved in water has a pH of around 8.3. Soda ash (sodium carbonate) dissolved in water has a pH of around 11.6. When using soda ash to neutralize acid spills you should be aware of the caustic nature of soda ash.

Although carbon dioxide gas is not particularly toxic, asphyxiation is a concern when the gas is allowed to accumulate in poorly ventilated spaces (STEL 30,000 ppm). Significant acid spills should not be neutralized inside cold rooms or inside tiny rooms with poor ventilation (carbon dioxide gas may displace all of the available oxygen & it becomes a hazard over 30,000 ppm) unless a self-contained breathing apparatus is used.

A common misconception about neutralizing acid spills with either baking soda or soda ash is that after the acid has been absorbed with the base, the residue is no

longer corrosive. **Acids absorbed in baking soda or soda ash will not be completely neutralized until the residue is dissolved in water.** When an acid is neutralized it forms the salt of the acid. The salts formed in the neutralization process may form a matrix into which the acid is absorbed, and therefore it cannot be fully neutralized. The residue from neutralized acid spills must be treated as a corrosive solid until it is hydrated with water. The spill residue must be collected in plastic containers, which are open to the atmosphere because carbon dioxide gas may still be forming from the residue (pressure build up may blow off the lid).

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