



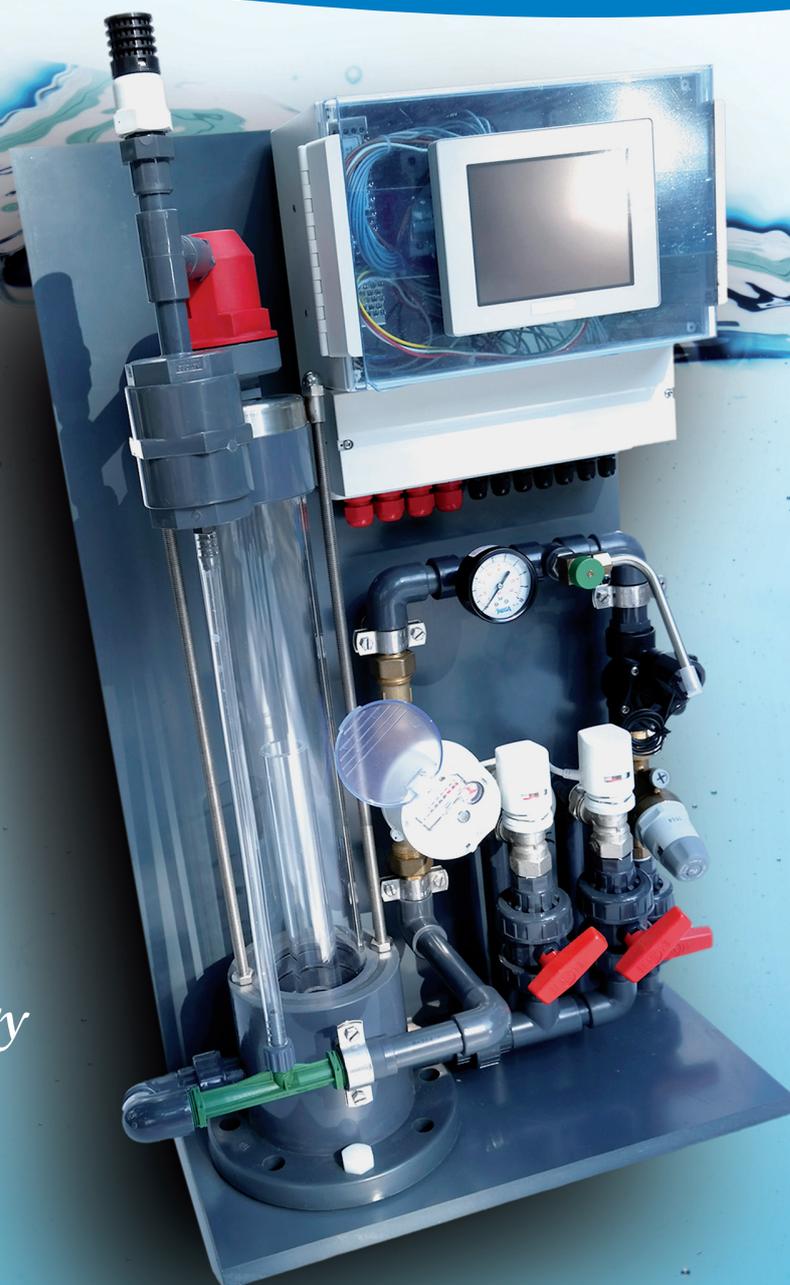
DE Ferro[®]dSi – NATURAL WATER TREATMENT

*Frees your groundwater of iron,
manganese and ammonium*

*With
a success
guarantee!*

NEW:

*The
innovative technology
for large
quantities of water!*





For large
amounts of water
consumption!

You are a major consumer of water as:

- Farmers or meat or egg producers,
- Operators of washing or laundry facilities,
- Organic farmers for poultry, cattle, fruit or vegetables.

You therefore have enormous costs due to your high water demand! A private well could provide a remedy, but your well water is unusable as drinking water or animal water due to excessive iron, manganese and ammonium values.

*With our **DE Ferro[®] dSi** water treatment system, you can solve this problem in a convenient way. Depending on the water consumption, the system pays for itself already after a short time of being in operation!*

HOW DO IRON, MANGANESE AND AMMONIUM GET INTO OUR GROUNDWATER?



Our groundwater originates from the infiltration of rainwater into the ground. Rain is oxygen-rich due to the enrichment with air. If this water makes its way into the upper soil zones, the soil bacteria consume the oxygen and in return exhale carbon dioxide. If this carbon dioxide comes into contact with the groundwater, it results in carbonic acid, which gives our groundwater a slightly acidic character.

The elements of iron and manganese are natural components of our soil and they are detached from the soil by rainwater and washed into the groundwater. They exist there in a soluble and therefore colourless form due to the lack of oxygen and the low pH value

Are iron and manganese in my groundwater?

The substances in groundwater are highly dependent on the soil composition. There are several methods for determining the content of iron and manganese in groundwater. The easiest, but at the same time most expensive alternative for you is to commission a drinking water analysis. Or try using a simple bucket test. To do this, fill a bucket with well water from a metre away using your garden hose nozzle. The water in the bucket must then rest for one day. If it has turned brownish-yellowish in the meantime and small black particles have formed, you can assume that there is iron and manganese in the well water.



WHAT PROBLEMS DOES THIS CAUSE?



What happens if the groundwater comes into contact with oxygen again at the earth's surface?

The iron and manganese contained in the groundwater combine with the oxygen in the air. In the process, the two substances oxidise into their water-insoluble form. Iron first forms a brownish-yellowish turbidity and after a short time brownish flakes (rust) develop. Manganese precipitates into small black nodules, which have a diameter of a few millimetres. Manganese nodules are often confused with sand particles, but unlike sand, they develop only after some time and can crumble between your fingers.

What are indications of the oxidation of iron and manganese?

Typical characteristics of oxidised iron and manganese in water are a brown or black colour of the water, an unpleasant metallic taste and residues in sanitary facilities. In addition to this staining, a high iron and manganese content also leads to gradual clogging of pipes, valves and nozzles and therefore to increased maintenance and repair costs. Even with your deep wells, a high iron and manganese content in groundwater can cause considerable difficulties. Due to seasonally increased water demand, the water ingress velocity in the well increases. Due to the highly developed groundwater depression cone around the well, the filter slots can draw in ground air. Oxygen oxidises with iron and manganese, whereby the elements in a water-soluble and colourless form change over into a solid state. As a result, the filter slots in your well clog. In such cases, it is called "iron hydroxide deposition in wells". Once iron and manganese have accumulated in the well, the additional settlement of iron bacteria can make the iron hydroxide deposition even worse. Larger well systems can be regenerated mechanically or by the use of chemicals, but this is always associated with considerable costs



HOW CAN YOU SOLVE THE PROBLEMS?

The water needs to be treated. In conventional treatment plants, the water is enriched with oxygen and then passed through backflushable filters. It is a method that is unfortunately associated with costs for cleaning and replacing the filters and that involves a large amount of heavily contaminated backwash water being produced.

The DE Ferro® dSi treatment system offers a better solution

With the DE Ferro® dSi water treatment, the actual treatment process is transferred to the water-bearing underground soil layers. The iron and manganese ions are bound there where they originate – in the earth! The soil thus acts as a large natural filter.



*For
large water
quantities!*

HOW IS THE WATER TREATED?

The DE Ferro® dSi water treatment system works with dual-well technology.

What does this mean? In one well, the water is treated while the second well is already ready for water extraction.

Depending on the size and number of your wells, an impressive 20 to 500 m³ of water is available to you per day.

To determine the optimal size of the system, we need the exact iron, manganese and ammonium content of your water as well as the daily water demand.

*After a treatment period of approximately two to six weeks, your water will fall below the limit values of the current Drinking Water Ordinance (as of 2009) for iron (0.2 mg/l) and manganese (0.05 mg/l). **We guarantee it!***

AND HOW DOES THE TREATMENT WORK EXACTLY?

A partial amount of water is taken from the well. This is enriched with the required amount of oxygen from the ambient air and flushed through the drilled wells on an alternating basis back into the aquifer.

There, the supplied oxygen oxidises with the minerals (iron, manganese and ammonium) contained in the groundwater to form water-insoluble substances. These are deposited in the soil as crystalline oxide





WHAT ARE YOUR BENEFITS?

- **Very high level of efficiency**

Due to the treatment of the water in the soil (large natural filter) and the low flow velocity that prevails in the soil (long action time for the treatment process), our system operates with a very high level of efficiency

- **Maintenance-free operation with no follow-up costs**

Unlike other water treatment methods, with our **DE Ferro® dSi** water treatment system you do not need to replace any filters and you do not need any chemicals for its operation.

- **Long service life of your well**

The separation of iron and manganese occurs at a large distance from the bored well (filter area). Since treated water is conveyed, the pump, well filters, piping and fittings remain free of deposits.

- **Automatic control of the system and pump**

The entire water treatment takes place in a process-controlled manner. The control takes place depending on demand and the successful regeneration is shown in the display.

- **Clean water**

In order to avoid nucleation, regeneration automatically takes place after 96 hours.

- **The technology adapts to your needs**

The entire system size can be tailored to your personal needs. (See table below). The desired amount of regeneration can be accurately set by using a contact water meter.



| Wells | Filter section | Removal per hour | Removal per day |
|-------|----------------|------------------|-----------------|
| 4" | 4 m | 4 Q | 50 Q |
| 6" | 5 m | 6 Q | 80 Q |
| 8" | 6 m | 10 Q | 120 Q |

DE Ferro® dSi

Professional water treatment



Protection
for
your well!

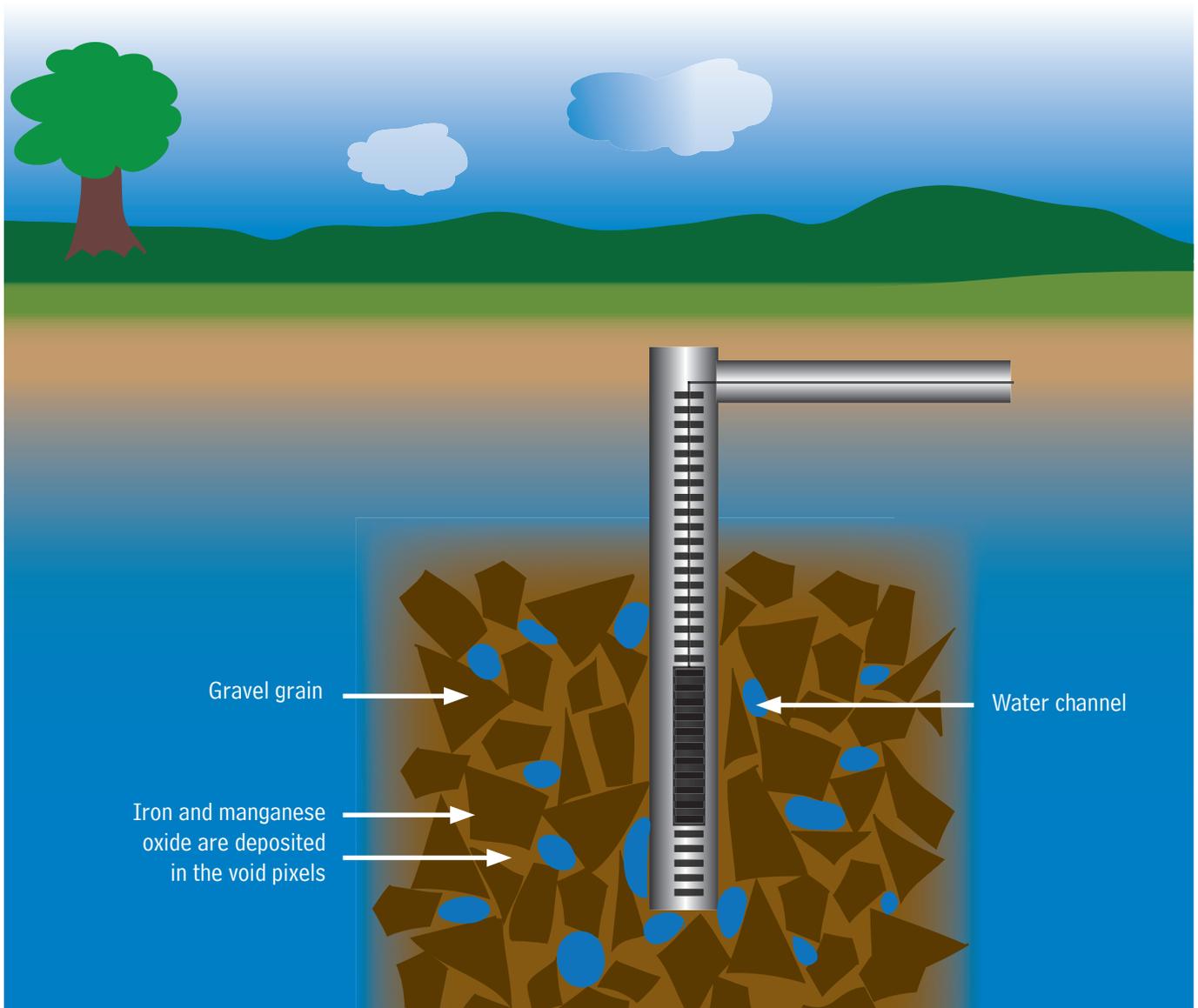
BUT WHERE DO THE OXIDES GO? DO THEY DAMAGE MY WELL?

What actually happens to my well if oxides settle there? I now have clean drinking water, but in turn in a few years will I have a clogged well? And that will certainly be expensive!

Where do the iron and manganese oxide actually remain?

The oxides are deposited in void pixels. Flow-optimised water channels form between the gravel grain and the oxide deposits (see diagram below).

Due to the enormous surface of the gravel grain, very large amounts of iron and manganese oxide can be absorbed without compromising the function of your well.





In fact, the service life of the well is even significantly prolonged with our type of water treatment, simply because the natural iron hydroxide deposition can no longer take place near the filter.

A reduction of permeability in the oxidation zone has not yet been observed in practice.

WHAT HAPPENS TO MY WELL?



A normal aquifer (fine sand to coarse gravel) has a pore volume of at least 30%. Assuming a water extraction of 100 m³ per day with an iron content of 5 mg/l, then about 2% of the pore volume of your well would be filled with iron oxide after an operating time of 10 years.

Even after 30 years, significantly more than 90% of the pore volume in the aquifer is available as filter volume.

You do not need to worry about the regeneration of your well until a plugging of voids of 80-90%.

Do I have even more benefits?

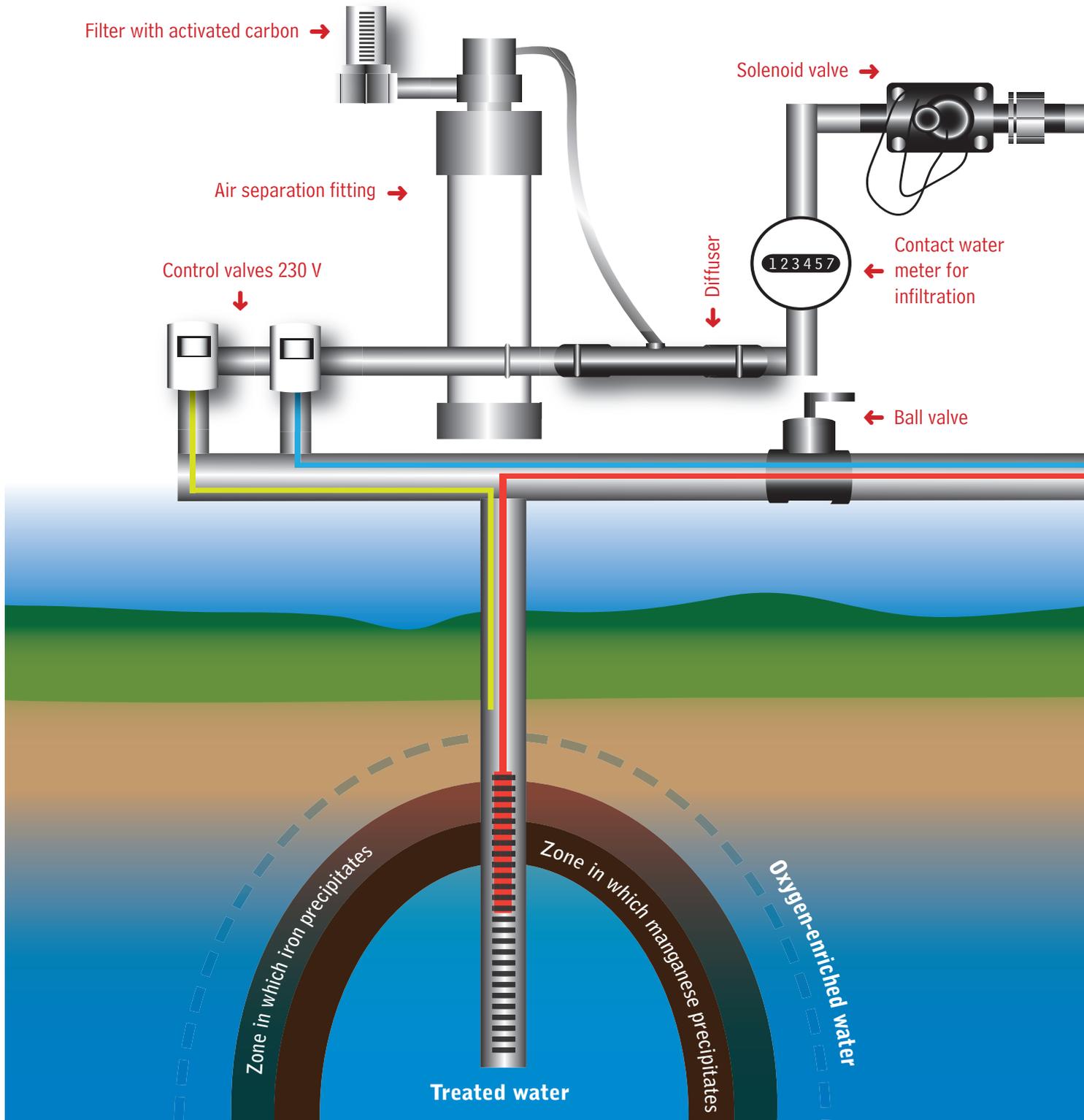


Since the entire amount of oxygen supplied in the aquifer does not react, a portion remains dissolved in the treated water in free form. The resulting increased oxygen content of the water cleans your water pipes and fittings after prolonged use.



*Dual well
technology!*

STRUCTURE OF THE DE FERRO[®] dSi SYSTEM



Professionelle Wasseraufbereitung

DE Ferro
Water Treatment

dSi

Pressure
reducer

Ball valve →

Contact
water meter
overall

For the water supply
to the network, home
and garden

← Pressure sensor

← Membrane vessel
60 or 100 litres

Dirt filter →

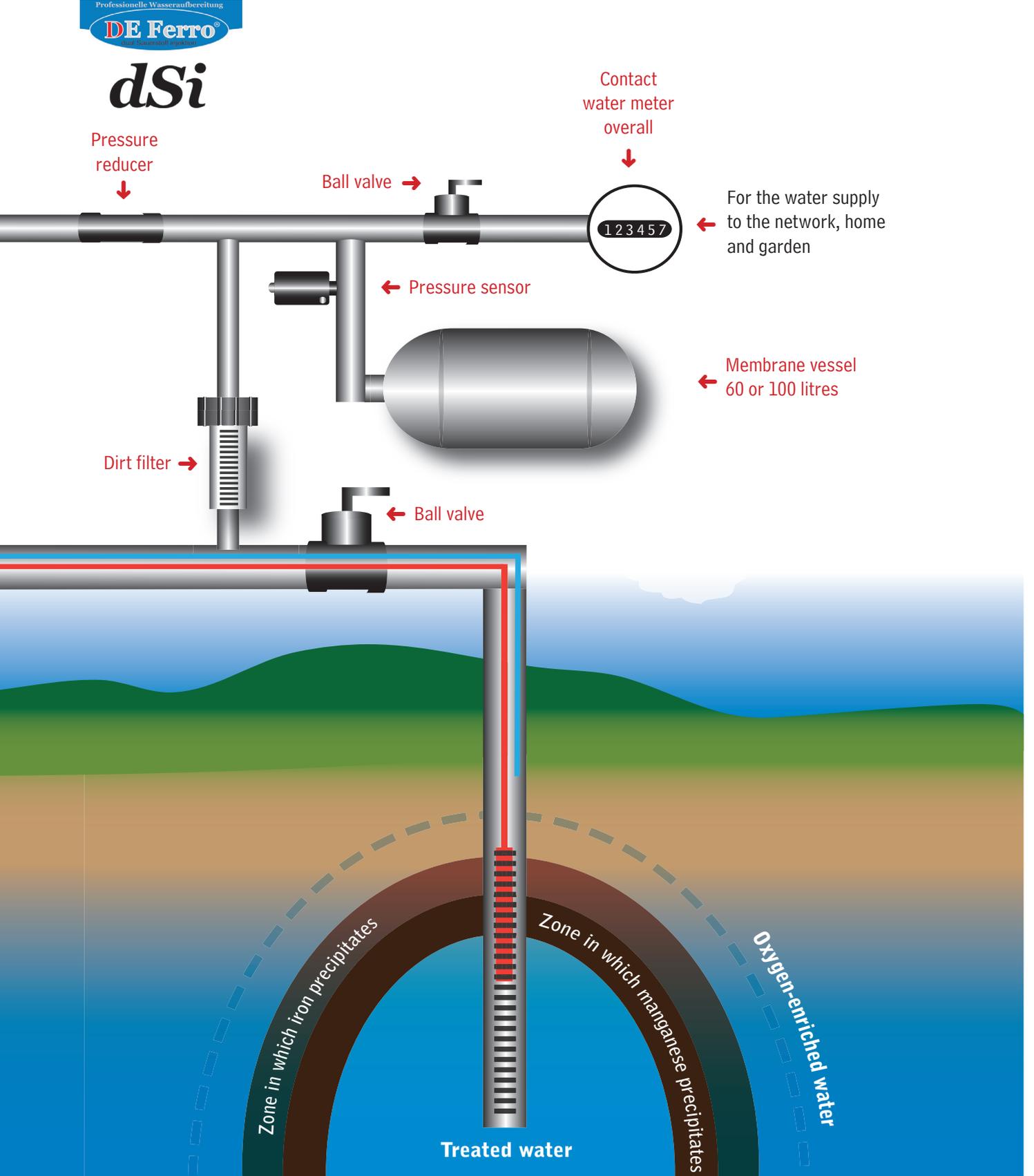
← Ball valve

Zone in which iron precipitates

Zone in which manganese precipitates

Oxygen-enriched water

Treated water

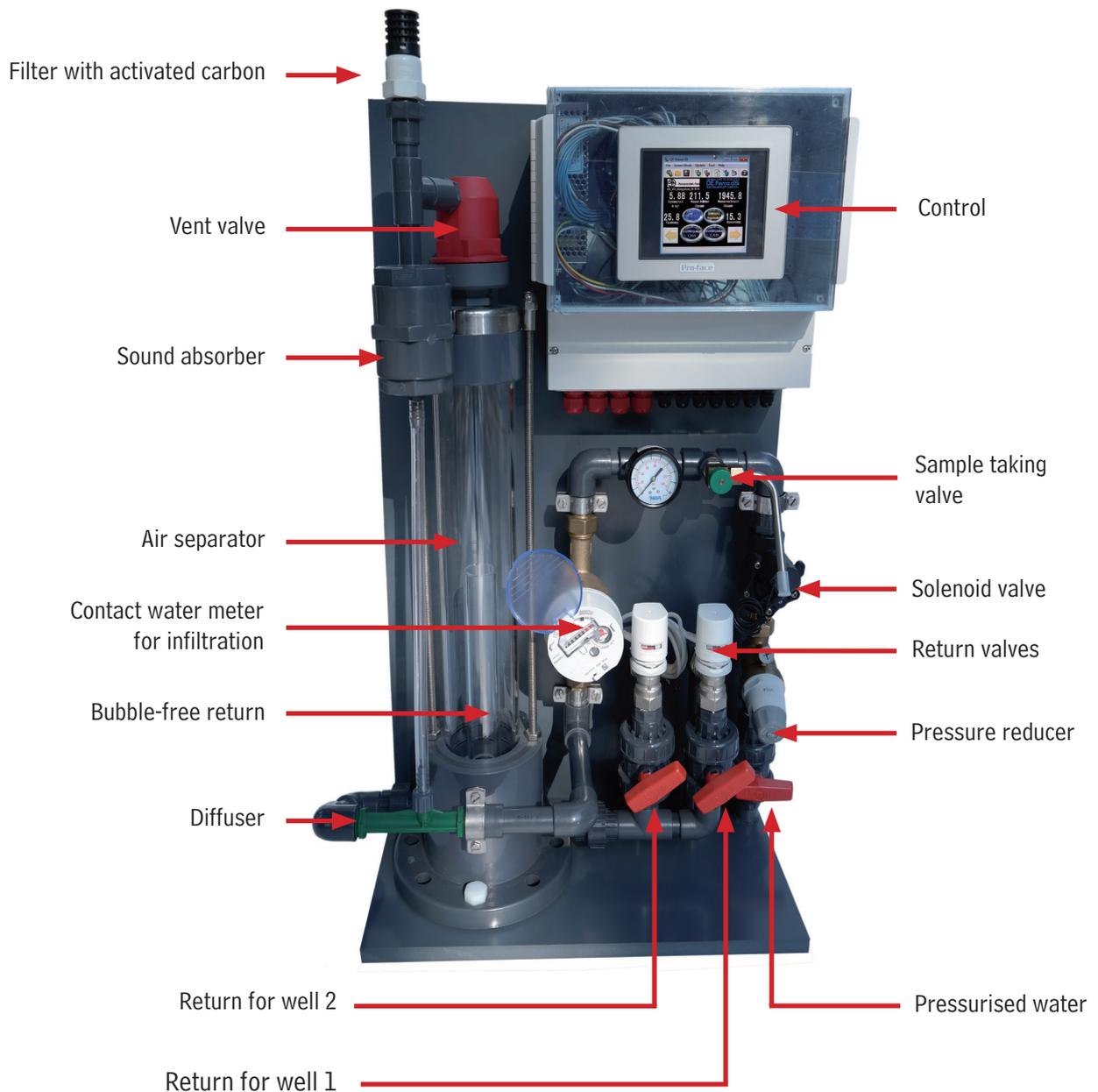


Easy to operate!

TECHNICAL DETAILS

Only high quality industrial components are used in our water treatment system so that many years of low maintenance operation are guaranteed.

In addition, our system is designed so that it even fits into the smallest spaces.



With a high quality industrial controller with an integrated touch panel, the **DE Ferro® dSi** system is easy and convenient to use.

In addition, you get all the important values and measured data at a glance. *See for yourself!*

THE TOUCH PANEL IN AN OVERVIEW



- **Easy to switch the pumps on and off**

Use one switch to turn your pumps and the **DE Ferro® dSi** system on and off.

- **Demand-based control**

You can use the display to regulate the water quantity to be regenerated, for example if you require a seasonal increase or decrease of your water quantity.

- **Display of the regeneration cycles and resting periods**

Use the display to read all of the information regarding whether your system is in the regeneration or resting phase. In addition, accurate data about the status or number of regeneration cycles is shown.

- **Monitoring of the regeneration process as well as the air and ambient temperature**

To counteract a contamination of the water if it remains in the well for a long time, regeneration automatically takes place after 96 hours. Thus, even in times where the withdrawal is too small, this ensures that the water quality is maintained.

In addition, the system continuously measures the ambient temperature or the air temperature and displays these values on the screen.

- **Consumption control**

The system shows both the exact amount infiltrated as well as the overall extracted water volume.

- **Remote monitoring**

Using the Internet, you can monitor and control your **DE Ferro® dSi** system or you can simply entrust us with this service.





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