

# Technology in harmony with physics



**30** for over  
**years**  
SKW®-System

SKW®-system, solution  
for horti- and agriculture



We are here for water!

## Award for **SKW®-system** in aviation

BOEING „Performance Excellence Award“ for **SKW®-system**



BOEING honoured 2016 out of over 15.000 suppliers worldwide only 82 with the category GOLD.

This award is annually presented to suppliers for their outstanding performance.

since over

# 30 years

we are saving resources and  
are increasing benefits

# Application of **SKW®**-system solution for horti- and agriculture

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General information



Field sprayer

Fruit and vegetable washing



Turf and field irrigation

Animal husbandary  
and - trough



Greenhouse

Greenkeeper



Vertical Farming and  
DWC-system

Golf courses



We are here for water!

# Functionality of SKW®-systems

## The Original SKW®-system

Made in Germany

Our product reduces the dynamic viscosity of liquids initiated by lorentz force of liquid-bearing systems. Such improves flowability and wetting.



*TÜV certified and recommended  
Made in Germany*

### Function:

**SKW®-system** changes the flow properties and reduces the inner friction of liquids.

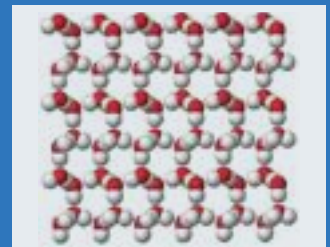
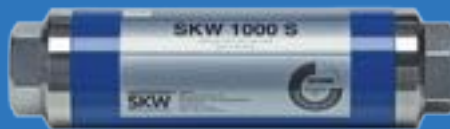
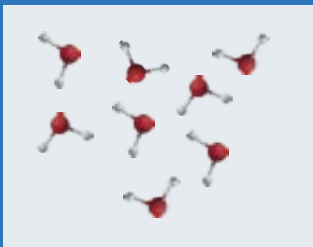
Measurable change of charge potential of the elements in the water.

The properties of water (physical – chemical) are of fundamental importance for an equilibrated water balance.

Oxygen is elementary.

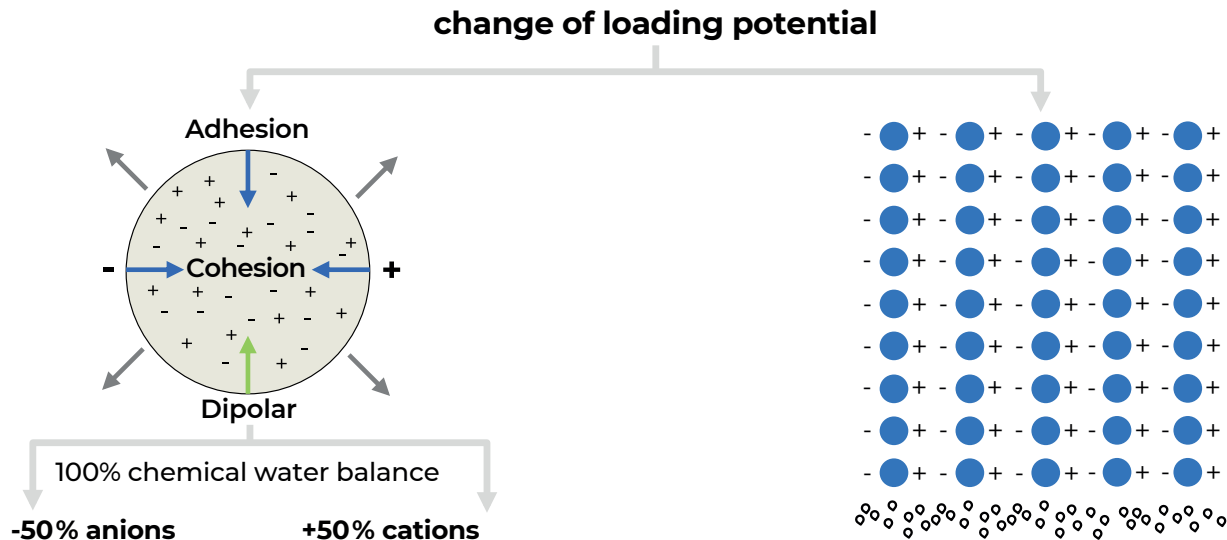
## A technology in harmony with physics

Lorentz force



Lorentz force initiates an electromagnetic impulse restructuring molecules.

# Influence of substance values of H<sub>2</sub>O + elements



The water analysis must be coherent.  
total of anions = total of cations

## Substance values of H<sub>2</sub>O + elements

### dynamic viscosity

*resistance caused by inner friction of neighbouring molecules*

### thermal expansion coefficient

*same mass higher volume*

### specific thermal conductivity

*Property of heat transfer resp. of overcoming of heat resistance.*

### cinematic viscosity

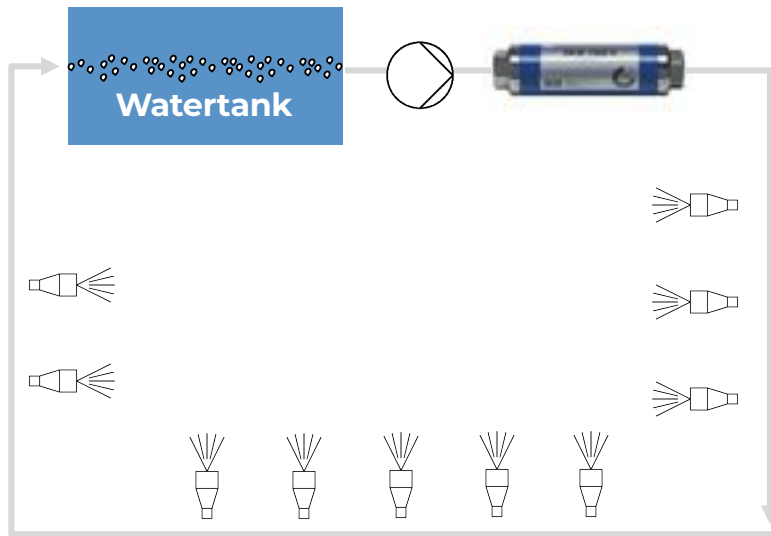
*like dynamic viscosity, but related to density*

### Thermal diffusivity

*property of transfer of temperature within a body or a system*

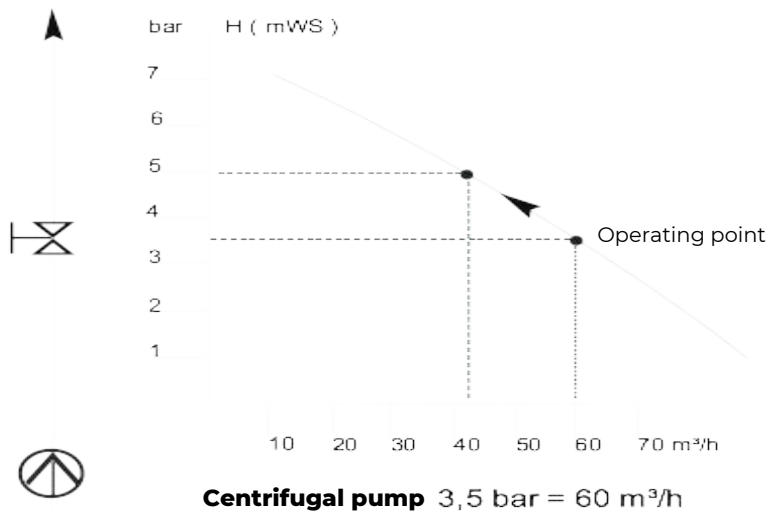
**” Nature does not know problems  
– just solutions.**

*Carl Amery*



**SKW®-system  
solves problems and  
increases yield security:**

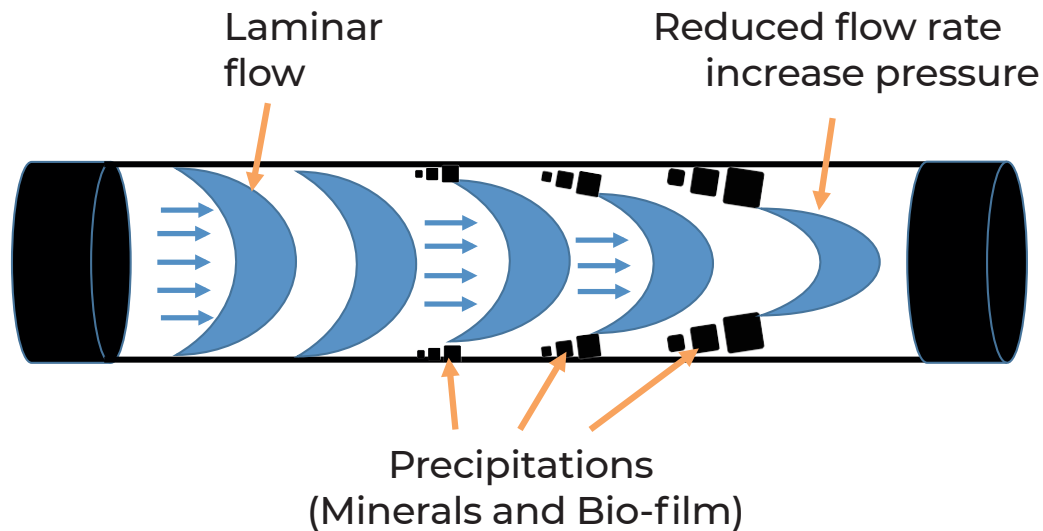
- Improved exactitude of water distribution
- Dissolution of mineral incrustations and bio-film
- Improved water-quality by more efficient oxygen intake
- Reduction of auxiliary products, like lyes, plant protecting products at same or improved efficiency



### Pump diagram

The operating point increases with resistance, **SKW®-system** supports lowering the operating point

## Incrusted or precipitated piping systems



### Caused by:

- Low flow rates
- Sedimentation when system is down
- Heat supported deposits
- Biological process

### The Solution:

**SKW<sup>®</sup>-system** inhibits precipitation of water-bearing systems with nutrient salts (organic) as well as solid  $\text{CaCO}_3$  - deposits (calciumcarbonate).



# Your challenges are our incentive

## SKW®-system solution



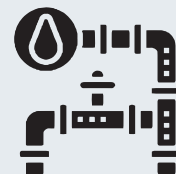
Differentiation  
in the market:  
Pressure by  
maintaining  
quality and  
profit



Deposits and Bio-  
films in the water-  
bearing systems



High costs  
caused by  
cleaning  
products, crop  
protecting  
products and  
energy  
consumption



Huge time  
expenditure  
for machine  
cleaning and  
maintenance

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# SKW®-system in aviation

## BOEING „Performance Excellence Award“

BOEING worldwide using 15.000 suppliers offers this award annually to those suppliers as recognition for their outstanding performance.

**SKW®-system** is one of only 82 suppliers being honored in 2016 with this award in the category GOLD.

**SKW®-system** is installed in the central cold water feed of the aircrafts prohibiting precipitations in the water-bearing systems including the vacuum toilets.

**SKW®-system** - general supplier  
Airbus GmbH and BOEING Commercial Airplane Group since 2000.



## Production according to national/ international standards

- Quality management – according Manual DIN EN ISO 9001-2000
- Material 1.4571 acc. DIN 17440 resp. DIN EN 10088-1/-2 for parts in direct contact with fluids
- Tested by TÜV NORD CERT GmbH, Essen

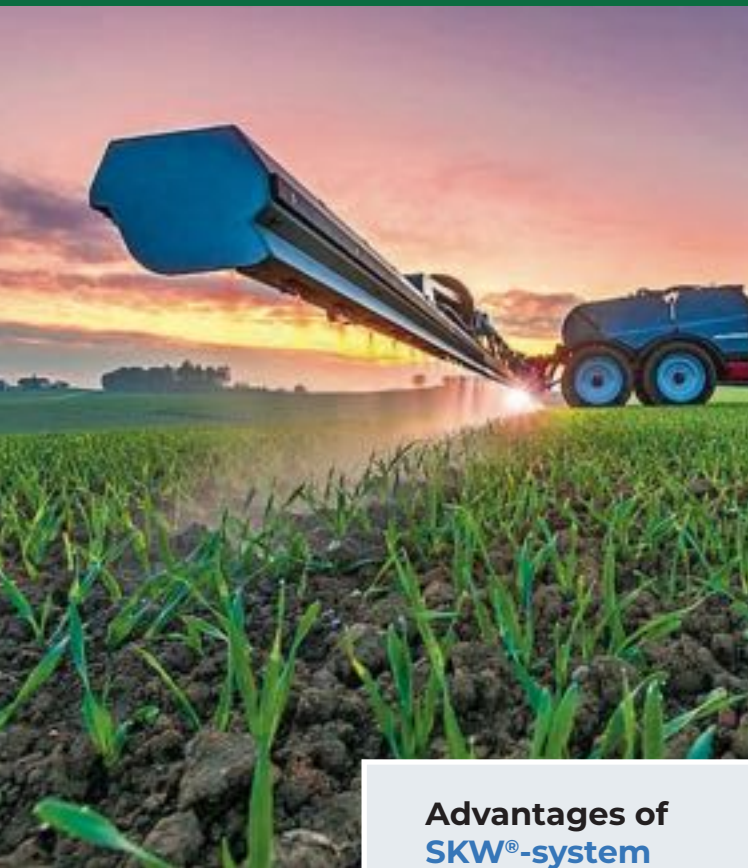


## National and International Approval for the aircraft industry

Airbus / BOEING  
Water Conditioner, ATA 38 for  
drinking water § 12 Abs. 4 AVB  
WasserV



**We are here for water!**



## Field Sprayer

### Benefit and advantage

Using **SKW®-system** we achieve a higher exactitude of **water distribution in the soil** as well as a more compact root - formation.

### Better yield

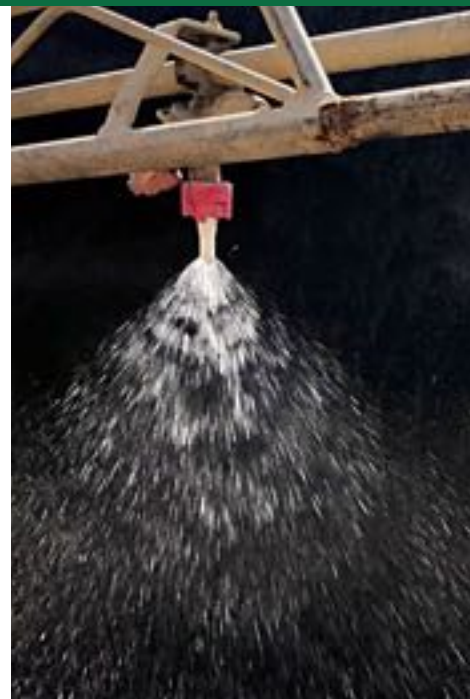
#### Advantages of **SKW®-system**

- Reduction of pesticides and soil additives through faster absorption and more efficient action
- Faster growth of the cultures
- Lower resistance in the pipe system increases the water flow rate
- Faster drying on the plant and fruit for an optimal application time and a wider range of use
- Less rinsing water consumption when exchanging the plant protecting agents.

## The difference at a glance



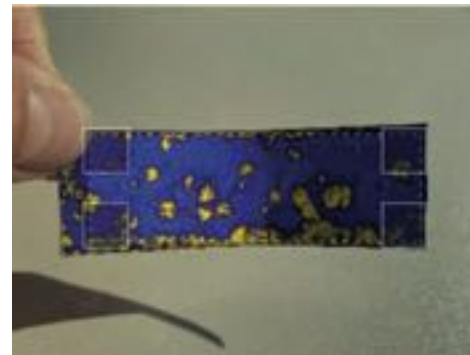
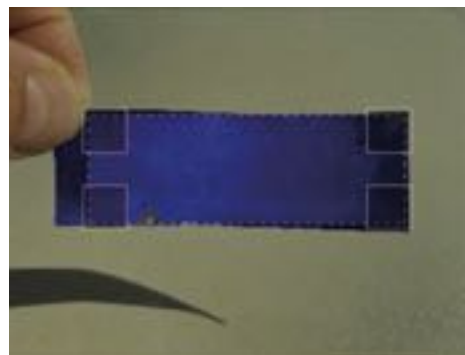
87,2 % wettening with  
**SKW®-system**



75,2 % wettening without  
**SKW®-system**

## Nutrient intake of the plant

On the test sheet a  
complete and  
uniform wetting  
is monitored and  
such is repeatedly  
monitored on the  
plants.



12 % better spray efficiency with **SKW®-system solution**



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# Advantages using SKW®-systems in plant protection technology.

Cultivation area [ha]	Reduction of plant protection products	Savings	Average costs in €/ha conventional	Ø €/ha SKW®-system	Cost reduction	Total reduction on total cultivation area given before mentioned	Type of cultivation
*611	10%	11%	652,74 €	580,94 €	71,80 €	43.870,- €	Iceberg salad (2 harvest cycles)
650	10%	10%	2.000,- €	1.800,- €	200,- €	130.000,- €	Strawberries
100	15%	15%	1500,- €	1275,- €	225,- €	22.500,- €	Fruits
400	20%	20%	400,- €	320,- €	80,- €	32.000,- €	General arable farming

\* Results certified by accredited laboratory

## Further environmental effect:

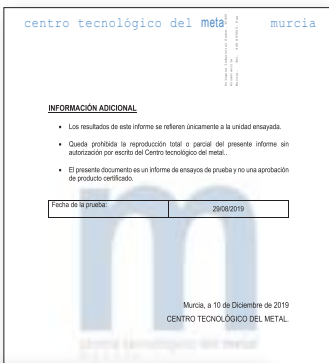
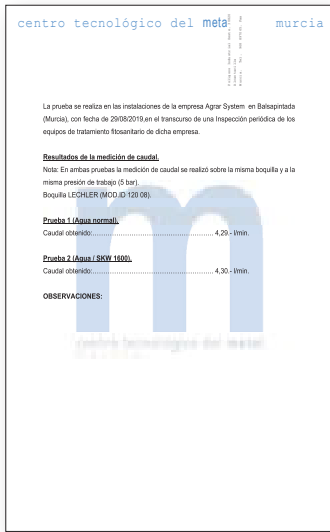
As per example 1 - in total 1772 plastic bins and 101 corrugated boxes are lesser required! Cleaning the sprayer unit 25 % lesser water consumption is monitored when changing the spray-liquid.

Another contribution to protect the environment!



REDUCING RESOURCES, INCREASING PROFIT

# Plant Protecting Technology TÜV



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# Turf and Field Irrigation

## Benefit and advantage

Using **SKW®-system** we achieve a **uniform water distribution exactitude in the soil** and a better root formation.

## Better yield

### Advantages of **SKW®-system**

- No waterlogging
- Different wetting and distribution exactitude
- Higher **added value / more turnover, better yield per m<sup>2</sup>**
- Better root formation and growth
- **Deeper water penetration in the soil up to 25 – 30 cm**
- Faster drying of the turf and the fruits
- No adhesion of tensides or minerals in the pipes



Irrigation without **SKW®-system**



Irrigation with **SKW®-system**

## Potentials in field irrigation

- faster intake of fertilizers and plant protecting agents in the system.
- increase of irrigation performance – larger surface covered at given pump capacity
- reduction of already existing calcification
- shorter irrigation running time caused by higher water flow rate at the nozzle

Irrigation of the field with the **SKW®-System** shows an even distribution of watering along the entire length.





**SKW®-system** allows faster water intake, not longer standing puddles or waterlogging.

„20 % faster drum hose intake  
normally operating at 25 m/h for  
12 h, now operating with 30 m/h  
hose intake irrigation lasts only 10 h.

Instead starting at 20:00 h –  
irrigation starts now at 22:00 h.

**No more drift problems!**

**” With 20% reduced irrigation  
per irrigation run, with  
permanent maintenance the turf  
could already be after 8 months.**

*Peter Capellmann*



Many thanks

Rollrasen Broicher Hof  
Peter Capellmann  
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Tel.: +49 (0) 2208 3890  
Mobil: +49 (0) 171 260 79 29  
Mail: peter.capellmann@t-online.de



without **SKW®-system**



with **SKW®-system**

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Using **SKW®-system** avoids clogging of water-bearing systems caused by deposits of nutritive salts (organics) as well as solid  $\text{CaCO}_3$  – (calciumcarbonate) .



**We are here for water!**



## Greenhouse

### Benefit and advantage

Using **SKW®-system** we achieve a uniform **water distribution exactitude in the soil** and a solid root formation.

### Better yield

#### Advantages of SKW®-system

**SKW®-system** reduces the dynamic viscosity of water. For the irrigation of the cultures (influencing the water hydraulics) – following advantages are reached:

1. **SKW®-system** avoids clogging of water-bearing systems, caused by nutritive salts or solid deposits of  $\text{CaCO}_3$  – (calcium carbonate).
2. Resulting in optimized availability of nutritive liquids and a homogeneous growth of the cultures.





Cucumbers



Herbs



Tomatoe



Salad

## APPLICATIONS

Example of drainage-earth-hoses with SKW® system after 1 year usage



No adhesion or bio-film in the hoses



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# Basil (Herbs) in the Greenhouse

The comparison

without **SKW®-system** with



Basil without **SKW®-system**



Basil with **SKW®-system**

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# Tomatoes in the greenhouse

The comparison

4 Kg / m<sup>2</sup> more yield using  
SKW®-system solution

Many thanks

Location:  
ECO Erika B.V.  
Tuinderslaan 20  
7887 VB Erica - Nederlande

Contact:  
Skoret van der Meij  
Tel: +31 651 477 430

Greenhouse of 20.000 m<sup>2</sup> with 2 types of tomatoes: „Claudio and Briosò“



45 Kg / m<sup>2</sup> yield without SKW®-system



49 Kg / m<sup>2</sup> yield with SKW®-system

  
**SKW**  


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## Cucumbers in the greenhouse

Lots of customers trust the numerous advantages of **SKW®-systems** in the cucumber greenhouse.

**SKW®-system** reduces the dynamic viscosity of water. the result is a very stable oxygen-containing root-hair-system allowing plants a better nutritive liquid availability leading to improved intake.

Using **SKW®-system** leads to significantly improved yield security.



Young cucumber plants with **SKW®-system** after 4 days on a new Grodan substate mat



**SKW®-system** in the pressure pipe to the greenhouse

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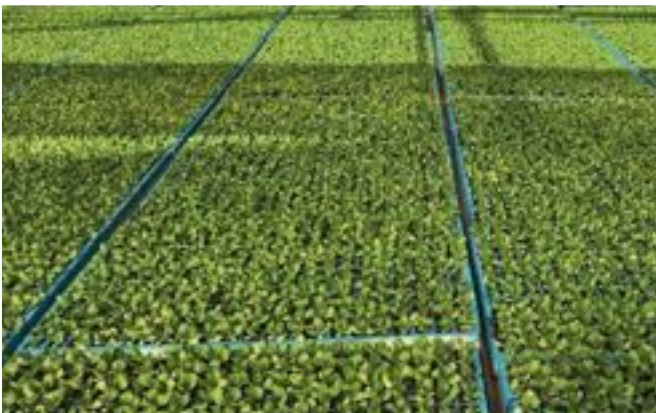


# Salad in the greenhouse

## The Comparison



Salad with **SKW®-system**



Salad without **SKW®-system**

without **SKW®-system** with





## Vertical Farming & DWC- system

### Benefit and advantage

Using **SKW®-system** we do achieve a uniform **water distribution** exactitude in the soil leading to compact root formation.

### Better yield

#### Advantages of SKW®-system

- Better cleaning off of dirt particles
- Shorter process time, more benefit
- Degradation of existing lime incrustation
- Improved oxygen input
- Less algae
- Short time of amortisation of investment
- Free of maintenance and operation costs



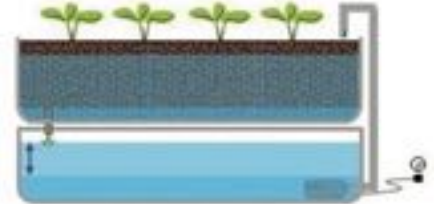
## Hydroponic systems:



**Wick system**



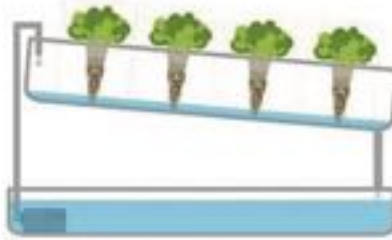
**Deep Water Culture**



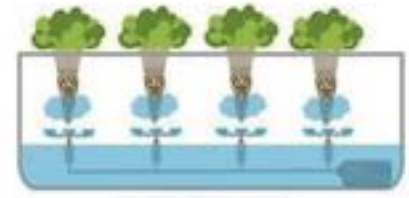
**Ebb- and flow-system**



**Drip system**



**Nutritive film technic**



**Aeroponic**

## Potentials

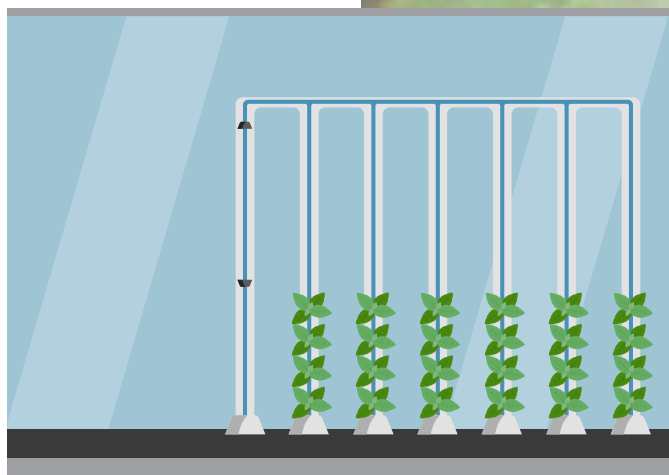
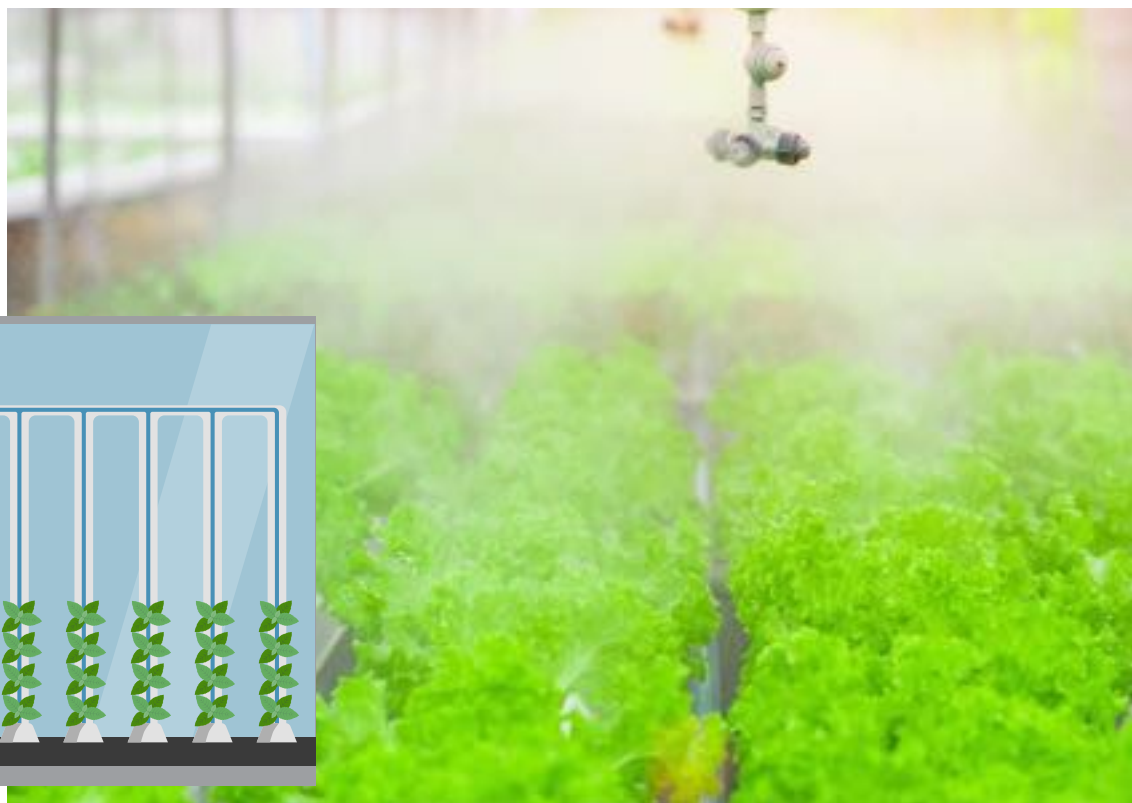
- increase of yield security
- fast absorption of nutrients
- uniform growth of cultures
- fine-tuned pH-value of culture and optimizing growth
- Optimizing water chemistry  
e.g. reduction of additives



**SKW®-system** allows faster absorption of nutritives contained in the water. This effect leads to quality and growth improvement.



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## Fruit and vegetable washing

### Benefit and advantage

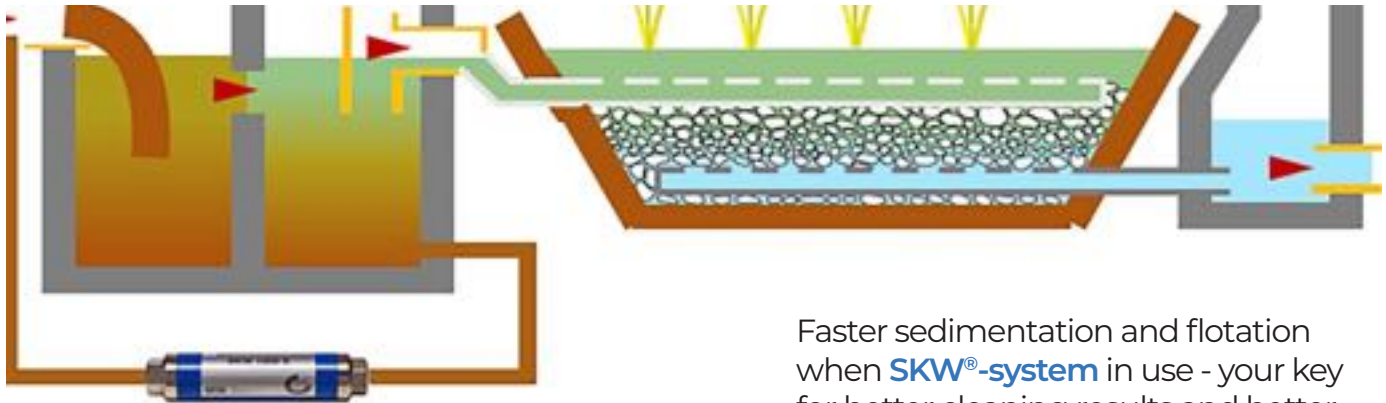
Installing **SKW®-system** cleaning is improved - optimizing sedimentation and flotation of dirt particles.

### Better yield

#### Advantages of **SKW®-system**

- Better cleaning off of dirt particles
- Faster process time – less operation costs
- Faster water intake and faster drying
- Better sedimentation and flotation
- Degradation of existing lime incrustation
- Short return on investment

# Water purification using **SKW®-system**



Faster sedimentation and flotation when **SKW®-system** in use - your key for better cleaning results and better water quality



without **SKW®-system**



with **SKW®-system**

## Potentials:

- Increase in specific separation of flotation (undissolved COD) by 10 - 20%
- Increase of DS-content in flotat
- Lower COD in clear water
- Adaption of water chemistry, i.e. significant reduction of additives possible
- Operation security in the active process





## Animal husbandry and drinking trough

### Benefit and advantage

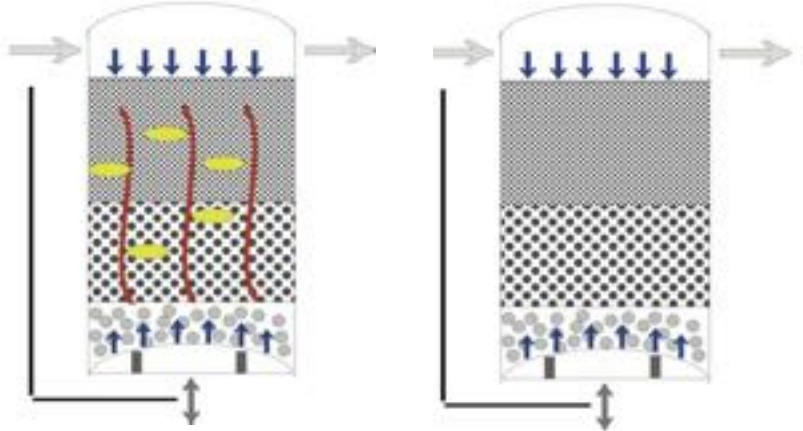
Using **SKW®-system**  
achieves better feed  
utilization optimizing  
daily weight gain.

### Better yield

#### Advantages of **SKW®-system**

- Activating metabolism and improved feed utilization
- Reduction of veterinary costs
- Clean water-bearing systems // degradation of existing deposits and dirt particles
- Reduction of ammonia load and better stable climate

# Hygiene of animal drinking trough



Sandfilter, where filter-body is clogged with biology

Sandfilter with **SKW®-system** with 100 % filter capacity



without **SKW®-system**



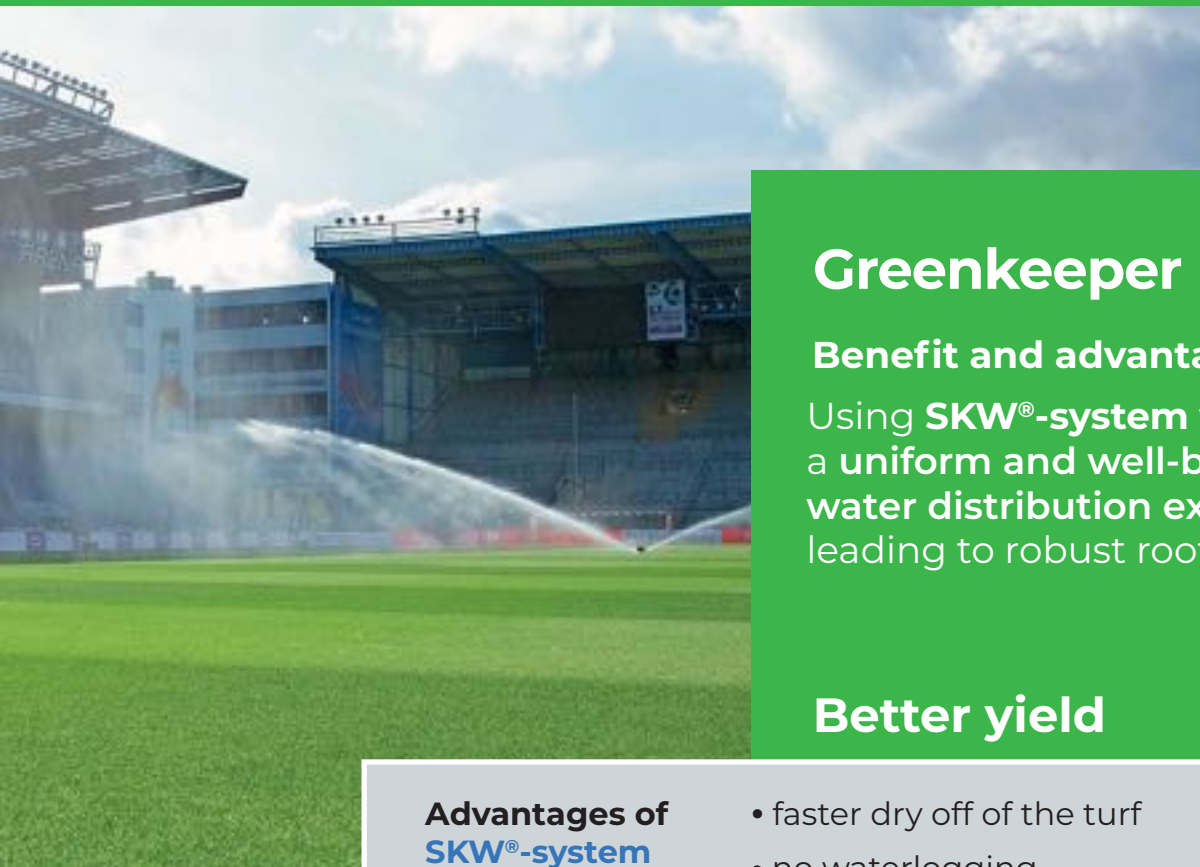
with **SKW®-system**

## Absorption of nutritive agents:

Lots of nutritive agents, incorporated in and eaten with the animal feed, are not water soluble. Therefore they are not migrating through small intestine into the blood and lymph.

These nutrients become water soluble, when broken down to smaller basic blocks.

Enzymes contained in digestive juices catalyse different cleavage reactions over many times. Thus the ingested food can be digested in a relatively short time.



## Greenkeeper

### Benefit and advantage

Using **SKW®-system** we achieve a **uniform and well-balanced water distribution exactitude** leading to robust root formation.

### Better yield

#### Advantages of SKW®-system

- faster dry off of the turf
- no waterlogging
- Reduction of foliar fungal diseases (Gray leaf spot)
- 12 months successfull use of SKW® system at footballclub DSC Arminia Bielefeld



*Repeating surveillance and control of turf by soccer field- and turf experts*

# Turf irrigation by SKW®-system



**SKW®-system** is just a cog in in the gearbox of the operating process. Through the use, the proper observance (compliance) of the other operating parameters (process engineering) is in no case superfluous.

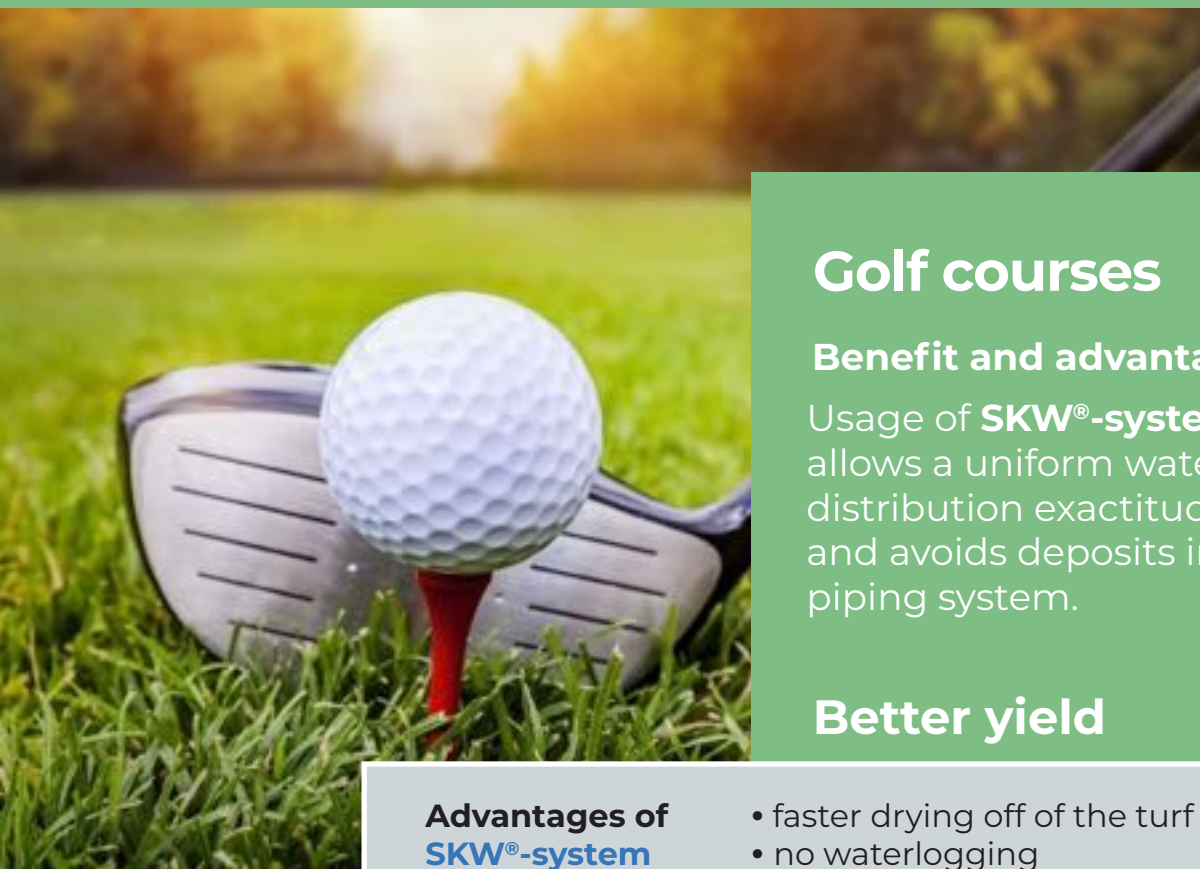
Rather the correct process technology is a fundamental requirement for using all the advantages of **SKW®-systems**



**SKW**®

We are here for water!





## Golf courses

### Benefit and advantage

Usage of **SKW®-system** allows a uniform water distribution exactitude and avoids deposits in the piping system.

### Better yield

#### Advantages of **SKW®-system**

- faster drying off of the turf
- no waterlogging
- Reduction of foliar fungal diseases
- Safe watering and drainage
- high load capacity of the turf base layer
- clean water-bearing systems
- Water quality – the be-all and end-all – of biological growth
- Lowering costs – optimizing fertilizers/additives
- high performance watering and draining of the green- and teeing areas
- Reduction of algae formation
- no odor nuisance by the pond water

## Heart of every pumpstation: **SKW®-system**



**SKW®-system** reduces the dynamic viscosity of water. Granting following advantages for your water hydraulics:

Using **SKW®-system** no more clogging of water-bearing systems by nutrient agents or by solid  $\text{CaCO}_3$  – deposits (calcumcarbonate).

Lime deposits are causing since ever problems, avoided only by time and costly actions. For new and existing pipings **SKW®-system** is the most simple way to get rid of it. Without any chemistry or energy.



**We are here for water!**

## Companies relying on SKW®-System



FOOD GROUP

GOLFCLUB



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Coca-Cola

Fripa

Bedford®  
Delikat essen



amag



LÖWENBRÄU



We are here for water!

# SKW®-system program

Type PN 16	Pipe Thread DIN 2999	Flange DIN 2501	Fitting Length L (mm)	Outer Ø (mm)	Weight netto G (Kg)	Flow rate V <sub>max</sub> m³/h
SKW 100 S	½"	DN 10	135*	38	0,6	1,2
SKW 380 S	½"	DN 15	200*	48	1,7	2,5
SKW 1000 S	1"	DN 25	290*	80	6,2	5,5
SKW 1600 S	1 ¼"	DN 32	450	120	24	13
SKW 1800 S	1 ½"	DN 40	540	120	28	18
SKW 4000 S	2"	DN 50	780	170	55	40
SKW 5000 S (Navy)	3"	DN 80	1100	200	160	72
SKW 6000 S	3"	DN 80	1500	200	182	110

\* fitting length without screw connection

# Fields of application where **SKW®-Solutions** are used

## Horticulture and Agriculture



Sprayer



Turf and  
Irrigation



Greenhouse



Vertical Farming  
and DWC-System



Fruit- and  
vegetable washing



Livestock Animal  
trough



Greenkeeper



Golf Course

## Industry and Commerce



Aviation



Vessels - Marine



Beverage  
industry



Evaporators



Sewage plants



Cooling circuits



Dairy



Paper  
Industry



Aluminium  
plants



Swimming pools



Domestic supplies



REDUCING RESOURCES, INCREASING REVENUES



# How to install SKW®-system



We are here for water!



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We are here for water!



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