

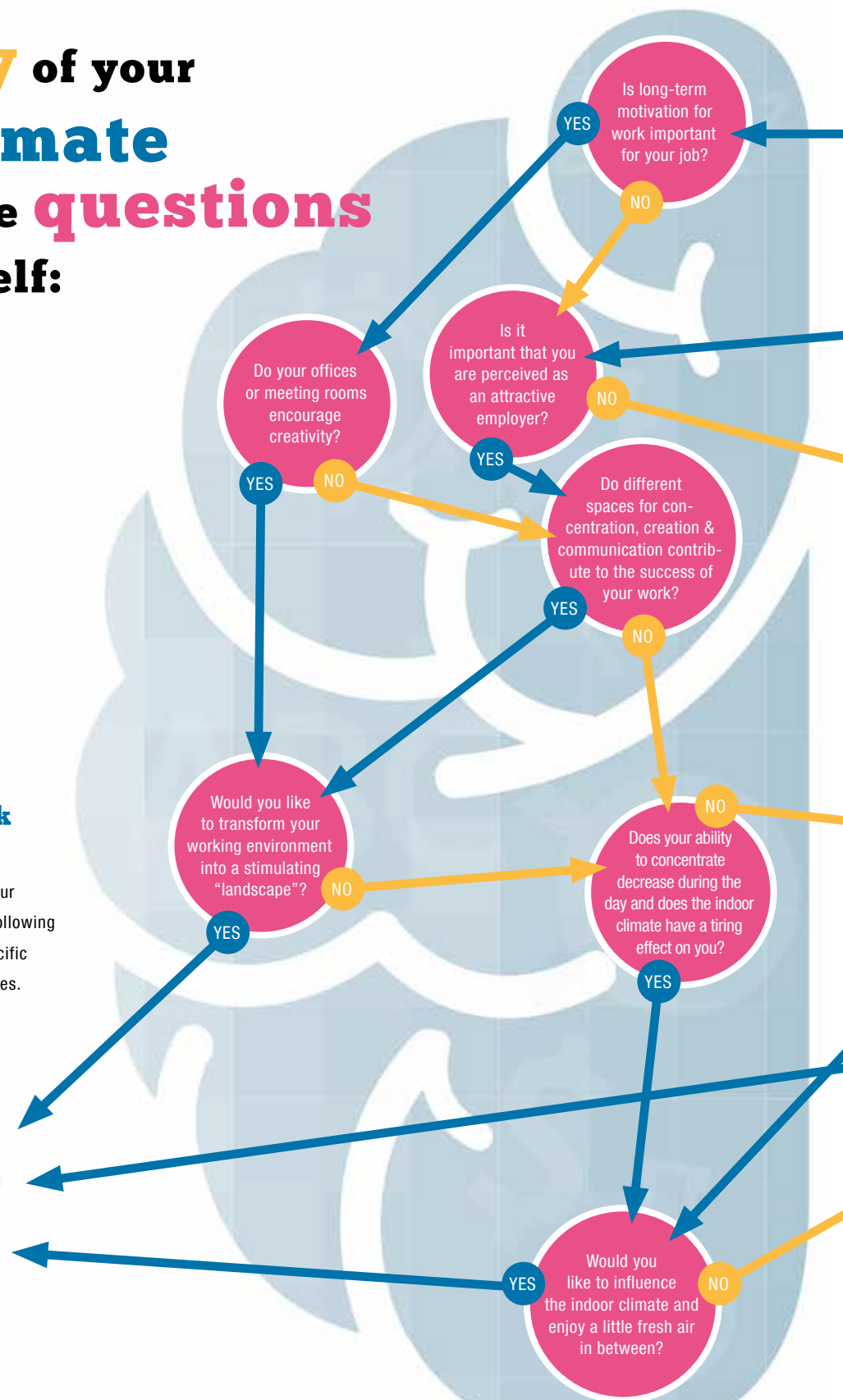


MODELLED ON NATURE

The **quality** of your **indoor climate** depends on the **questions** you ask yourself:

We invite you to re-think indoor climate!

A healthy indoor climate significantly helps your motivation, productivity and well-being. The following pages present trends, lots of information, specific suggestions, and interesting customer examples.



START

YES

Is it important for your job that you retain a clear mind during the day and have a productive working environment?

NO

YES

Do you receive visits from customers and partners every day with whom you would like to work in a stimulating atmosphere?

NO

YES

Do your current indoor climate measures in your premises fall short and do you perceive the air as being unpleasant and dry?

NO

Do you sometimes long for a place that is exciting and stimulating in which you can allow your mind to wander?

NO

YES

Are well designed spaces, in which people work more productively, more happily and creatively, trail-blazing for your business?

NO

YES

Do you have the impression that you could achieve more in terms of your productiveness in a different environment?

NO

YES

YES

Do you believe that efficiency, health and well-being complement each other and that it is possible to re-think the indoor climate?

NO

YES

Do you sometimes wish that you had more natural areas in your office with plants and green areas?

NO

We invite you. Challenge us!

Indoor climate solutions have to be economically efficient, comply with operational safety and ensure measurability.

This is regardless of whether you are refurbishing your existing building or constructing a new building.

The following pages provide important information relating to all future decisions.



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PREFACE

25 years ago we experienced for the first time the positive impact plants and water features can have on the interior climate and thus also on the people living and working in these spaces. The subsequent developments in hundreds of different customer projects represented completely new approaches. People's health, well-being and performance were now at the centre of everything we did.

Today we are thrilled that buildings are being designed in a manner that conserves resources and can be operated energy-efficiently, as it demonstrates the interest there is in natural climate systems. Clients, investors and architects now have the certainty of obtaining solutions from art aqua to meet the exacting standards governing health, well-being and performance in the homes and working environments of tomorrow.

What motivates people in this development? It is the feeling of nature they have indoors.

From this responsibility, we are therefore taking the next step and putting our conviction on trial: this magazine backs up the advantages of our products with scientific studies, as we have been rated by independent climate experts. We hope that our customer references at the end will inspire you to consider a better indoor climate.

Rediscover indoor climate with us.



Ivo Lai

A handwritten signature in black ink, appearing to read 'Ivo Lai', with a stylized flourish at the end.

Biophilia

Nature-based Design from Life (Bios) & Love (Philia)

In terms of technology, we have made major progress in sustainable construction. Buildings are now being designed to save resources, they can be operated in a more environmentally-friendly way and thus win coveted awards, which have become a key factor in the specification for clients, investors and users. However, there is a need to catch up in terms of the sensory experience of this progress. People, whether users, residents, customers or guests, experience this progress too rarely. Sustainability is visible in the operating costs or returns, but cannot be truly experienced, even although people wish their senses to be addressed and stimulated. There is a growing need for people to go back to their origins, above all within our built environment. “Biophilia Architecture”, which meets this need, defines this sentiment in a strong and innate connection between man and nature, finding expression in unquestioning empathy. We are fascinated by the crackling of fires and the roar of waves; looking over our garden calms us, while a walk in the park releases creative thoughts and shadows and heights amaze or impress us. Are our empathy and feelings of belonging to nature biological; is the “Biophilia”, as it were, a part of us? According to the US company TERRAPIN BRIGHT GREEN, which has been conducting research and development in this field for many years, the answer is yes. It is the biophilia, which accounts for the intimate camaraderie a person has with a dog or the liberating aspect of a walk through a forest. TERRAPIN BRIGHT GREEN is therefore examining the characteristics and patterns between man and nature in an attempt to revitalise this connection, applying them to “Biophilic Design” and “Biophilia Architecture”. In a comprehensive study, the company

“GOOD DESIGN MEANS BETTER PERFORMANCE IN TERMS OF BOTH HUMAN AND NATURAL ENVIRONMENTS - BUT ABOVE ALL, WE MUST MAKE OUR BUILDINGS BEAUTIFUL.”

WILLIAM BROWNING

analysed that integrating nature into built environments is not just a luxury, but above all a sound economic investment in the health and productivity of people. The core of this nature-based design therefore involves adapting this “naturalness” within a man-made environment and thus creating a more environmentally-aware and healthy life in the long term. TERRAPIN BRIGHT GREEN therefore combines research and application under one roof to pursue a more holistic approach and draws upon neurological and physiological studies for all its results. In actual fact, “Biophilic Design” reduces stress, increases cognitive functions and creativity, improves our well-being and speeds up the healing of diseases. These are benefits that are called on more and more amidst our increasing urbanisation and can prevent economic losses running into billions in the face of increasing work demands. It needs to be a top priority to reconnect man to nature, regardless of generation and background. After all, the power and impact that nature can unleash, is and remains unique. TERRAPIN BRIGHT GREEN provides (interior) architects and product designers considering this approach with guidelines and recommendations for biophilic design. It provides guidance on how certification standards and biophilic elements can complement each other and jointly define the fourth dimension of sustainability: our senses. After all, we are all appealed to and stimulated by our senses and they are how we hope to reach the architects, product designers and interior designers of tomorrow. Our senses are the most important maxim for art aqua: motivating, activating and stimulating. That is how we can shape the urbanisation of the world in harmony with nature.

The Aesthetics of Office Environments

Excerpt from the study by Dr. Uwe Röther, Erfurt University of Applied Sciences

Environmental and psychological research has repeatedly shown that nature, or views of nature, have positive psychological effects (Kaplan, 1983; Kaplan & Kaplan, 1989; Wohlwill, 1983). Furthermore, views of nature lead to a higher aesthetic evaluation and a greater feeling of well-being than views of non-natural environments (Ulrich, 1979, 1983 Wohlwill, 1976). Finally experiments conducted by Bringslimark et al. (2011) show that considerably more plants are positioned in windowless offices than in offices with windows and views of the countryside. This makes it clear that nature, in the form of views or house-plants, presents a quasi adequate factor for general well-being in offices. Furthermore, different studies have shown that plants in office environments have been shown to have a positive impact on employees.

Alongside the de facto improvement of the indoor climate, plants also promote a feeling of well-being and calmness amongst people and also reduce symptoms of fatigue and stress (Muschiol, 2007; Shoemaker et al., 1992). Similarly, plants can compensate for a lack of a view of nature and thus improve performance at work (Flade, 2008). A possible explanation for this is offered by the Attention Restoration Theory (ART). According to this theory, plants draw effortless attention to themselves and cause the individual to take time to look at them. A person's ability to concentrate is restored during this phase and he feels regenerated.

In summary, it can be posited that the presence of plants leads to a more positive assessment of office environments.

Design as a Factor for Success

Excerpt from vitra "Office Style Guide"



'Greening' the work environment
improves productivity by

39.6%



The level of detailing in a room
improves productivity by

43.9%

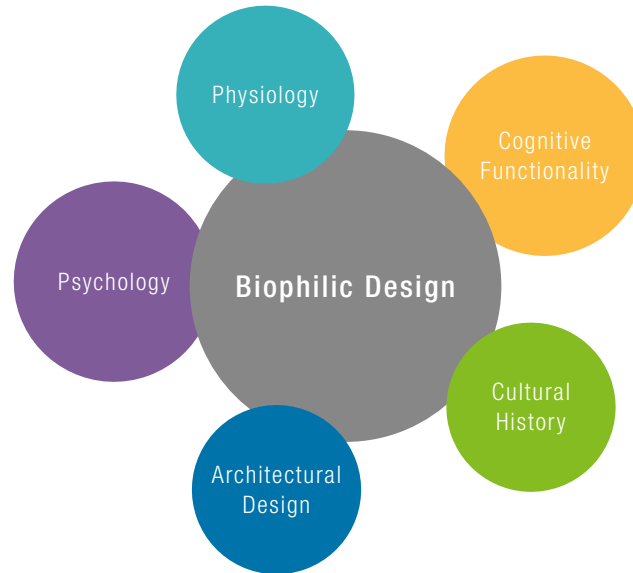


Targeted use of plants
can increase satisfaction at work by

40.7%

Biophilia Architecture as a blueprint for future urban districts and buildings.

WILLIAM BROWNING



How would you best describe 'Biophilic Design'?

W.B. People link architectural or interior architectural designs, based on biophilic design patterns, to positive experiences in nature, and their health and well-being is thereby supported.

What is the scope of the work and services provided by TERRAPIN BRIGHT GREEN and what expectations do your customers have?

W.B. TERRAPIN BRIGHT GREEN is a research and consulting firm that researches and works at the interface between nature and design. We are presently working on a series of sustainable building projects, including an 118-floor high-rise building in Malaysia, a 300,000 m² office building in Manhattan and an eco-district for a large medical campus. We have a long-term consulting contract with the State of New York, which involves analysing

how we can solve future design problems more smartly based on bionic characteristics inspired by nature. TERRAPIN BRIGHT GREEN is currently attempting to develop buildings based on the local ecosystem services. We are working with a series of customers, including Google, to produce guidelines and structures for biophilic design.

What are the most important research fields and why?

W.B. Our two most important fields of research are biomimetics (bionics) and biophilia. In both fields we are analysing inter-relationships between ecology and health and examining how we can positively promote the well-being and health of people.

From which sectors do your customers come?

W.B. TERRAPIN BRIGHT GREEN has a variety of customers, some from the real estate sector, Disney, Google and Starwood Hotels

design agencies, as well as American banks. What they all have in common is an interest in environmental themes and health and, associated with this, in the development of products and concepts that, in turn, focus on efficiency and productivity for their customers and employees.

What potential does the biophilic design approach have for Europe?

W.B. There remains a need for nature as more and more of life is played out in urban spaces. There is an urgent need across the globe to reconnect urban man with his original nature. And Europe is one of the world's most urbanised regions. Happily we have a strong and traditional culture of parks and gardens, which always takes nature into consideration in urban areas. The major potential lies in expanding and maintaining this tradition in future urban developments, as well as in greening existing (interior) architecture.

What are the strongest drivers in biophilic architecture?

W.B. Biophilia Architecture and Biophilic Design show clearly that it is possible to lower stress, improve people's cognitive functions and enhance their creativity. These are all benefits that have a positive impact on our health. These features pay off in terms of a person's health and also improve their well-being and performance.

How and where can interested developers, operators, users and designers find more information?

W.B. There are more and more research results and scientific articles and publications on Biophilia Architecture. TERRAPIN BRIGHT GREEN also publishes interesting information online: www.terrabinbrightgreen.com. There is also plenty of information to download.

WILLIAM BROWNING



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WHO WE ARE AND
WHAT MOTIVATES US

With its contemporary, innovative water features, vertical gardens and Green Walls, art aqua makes an important contribution to the everyday indoor climate, as our products make a lasting improvement to the quality of life. For over 25 years, well-being, health, performance and economic efficiency have driven us towards making this contribution. It is immaterial to us whether the construction project is an office building, hotel, hospital or showroom. With our team of construction biologists, horticulturists, architects, designers, engineers and consultants, we calculate and develop a solution for every indoor climate that you are sure to take pleasure in. All water and plant features are guaranteed to promote motivating, calming environments and provide sources of productive and creative work.

FRAUNHOFER INSTITUTE IAO



Task

To redesign existing office environments into modern workplaces. To adapt both the indoor climate as well as the fit-out of the space with renewable energy to create a contemporary “Green Office” style. The working environment ideally should provide health-promoting stimulus, with employees experiencing the feel of having a break from everyday life.

Solution

A green wall in an open-plan meeting area produces creative stimulus, promotes vitality and is a natural alternative to normal acoustic plaster. These are effects that can be underlined by water walls and planting modules in the workplace. Fax and photocopier stations are also enclosed by planted hedges, which absorb the pollutants produced by the technical equipment and regulate air humidity in the long term.



Facts & Figures

Address

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Contact | Architect

Architekt Ben van Berkel UN Studios Amsterdam

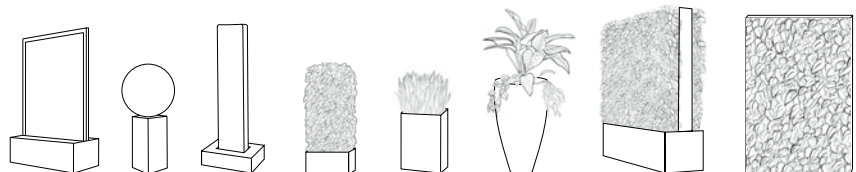
Type of space

Open space

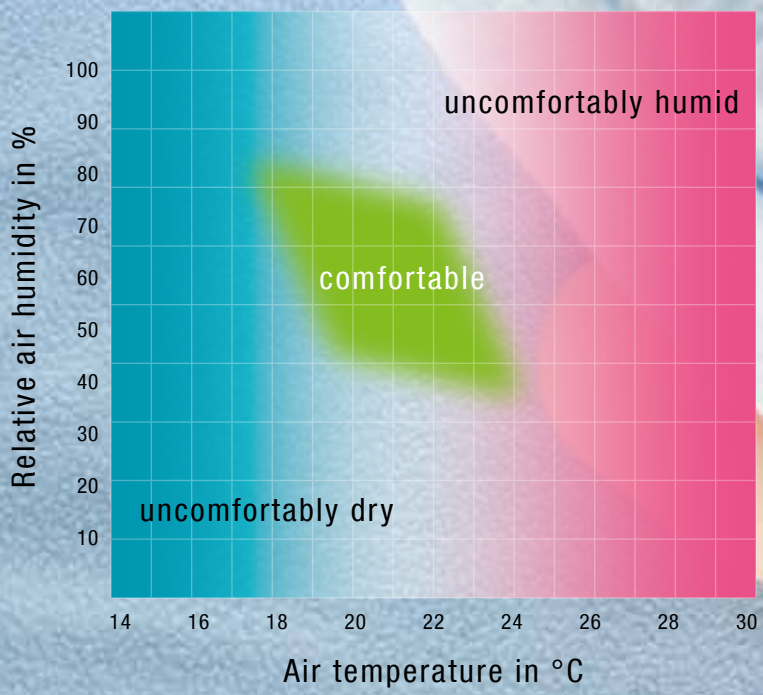
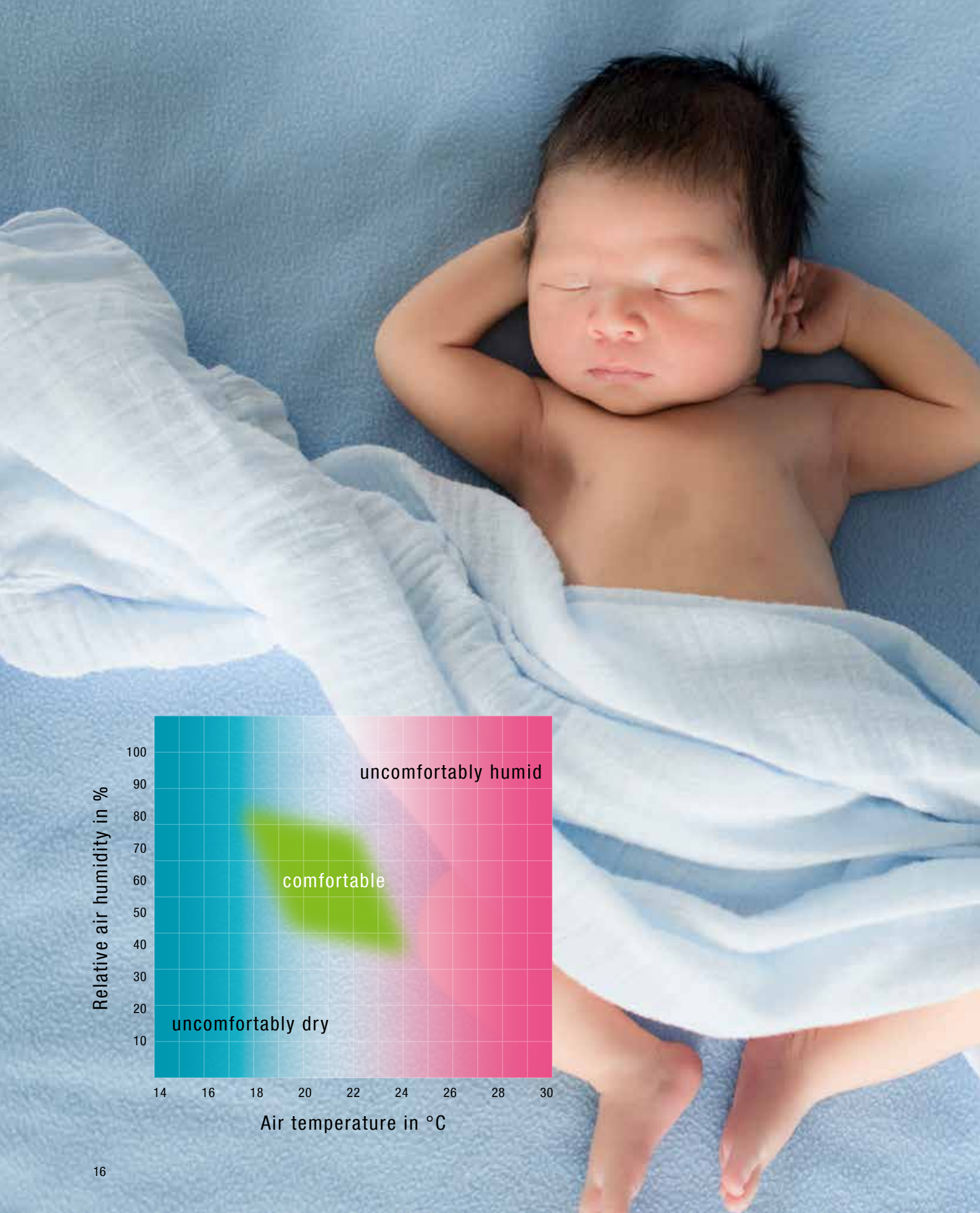
Industry

Research and Development

Products used







Moist air is perceived as being warmer than dry air, as air humidity has a positive effect on our perception of warmth. art aqua utilises this effect for its climate water walls. This is how we keep spaces warm enough for people to feel comfortable in them and humid enough for them to be as healthy as possible: in the hygrometer-controlled comfort range of 50% percent air humidity and around 21 degrees Celsius. We calculate the size of the area of water needed to achieve this in relation to the space, thereby creating lasting and continually optimum indoor air quality. Purely physically, our walls initially reduce the effects of cold evaporation with increasing humidity, because the gradient between moist air and saturated water film becomes less. We thus ensure that we do not create an environment for mould or mites caused by too high air humidity and protect respiratory airways from drying out. Mucous membranes thus remain relaxed and thoughts fresh!

PERFORMANCE:
WITH MEASURABLE EFFECTS!



The opportunities for a hybrid WORLD of work for our company.

PROF. DR. WILHELM BAUER

What are the key issues that most concern your customers at present?

W.B. Our customers are primarily concerned at present with how digital transformation is going to change knowledge and office work, as well as service and production work. Above all we are increasingly asked how people can still feel human in an increasingly digital environment. I believe that we are heading towards a hybrid workplace in which so much is done digitally, but in which there is simultaneously a growing need for reality, for the physical and for what makes a human being human: flesh and blood not just synapses and index fingers.

What are the biggest changes in terms of the architecture of work?

W.B. Work is becoming increasingly connected, more communicative, with exchanges in open, project-based structures and processes being crucial for success. Creativity, openness and transparency, cooperation skills and a readiness for dialogue are essential for the success of a company. These are all skills and qualities that make human beings human. And naturally humans are crucial for this success, with machines and the internet “merely” being the relevant platforms.

What findings have you made in your research work in the last two years?

W.B. We have clearly ascertained that successful companies increasingly have to offer more to find and retain highly qualified people. The quality of the working environment is a key attractor for young employees. Therefore it is not just the interesting technical devices, flexible working hours and remote working options that matter; the place where employees come together – the room, the building – is equally important. High-performance digital workplaces and high-quality physical spaces are the second side of this success.

What were the key research fields and why?

W.B. We very intensively considered the question of good and intelligent lighting, acoustics that support work and promote relaxation and the effectiveness of water and plants in the office workplace. And we have seen how important these elements are for the well-being of employees, on the one hand, and performance, efficiency and productivity on the other.

Research continues to be extremely important in understanding the society of tomorrow. To what extent?

W.B. I believe that in a highly developed society, the search for the new and innovative and the right path can be trail-blazing. However this requires fundamental considerations, analysis, studies, forecasts and supporting evidence: in short, scientific research.

Today's systems - including work systems - are very complex. Research makes targeted innovation possible. And we all live from innovations here in Germany and Europe.

Which companies benefit significantly from the findings of your research and the associated success factors for a new world of work?

W.B. All companies that deal with research and innovation stand to benefit from our research. The manufacturers of systems and products, as they can gear themselves creatively to the innovation process and to demand, as they know whether solutions can work or not. And application companies, that is the operators and users of offices, as they know which solutions and products to use to best reach their goals: with productive and satisfied employees.

In which departments of companies are you interested for the content of your day-to-day work and why?

W.B. Now then, there are so many departments: first and foremost the Management Board and managers, as well as the responsible personnel within Facilities Management, IT and increasingly Human Resources. And, of course, also the responsible personnel within Health Management, Occupational Health and Safety and Sustainability Management.

What have been your own personal highlights over the past two years in future research?

W.B. I was interested above all in how quickly our society has noticed that 'placeless' work does not really make people happy. Many people have learned that working from home can be good and make sense – especially when you have to look after children or older relatives. But it can be really motivating to go to an office building, meet other people there, enjoy the quality of the environment and simply work. And that is precisely what sets the hybrid world of work apart: lots of mobile work, digital processes but also spatial quality in exciting and interesting (office) workplaces.

What do you think will be the strongest drivers of change in the coming years?

W.B. First and foremost, a strong sense of awareness of what represent genuine, high-quality physical elements and objects you can touch and feel. People have a greater need for good buildings, comfortable furniture, good indoor air and naturalness. Health will be the main topic of the next few decades, combined

with an appropriate proportion of digital. Both will be important.

We've all heard of the "City of tomorrow" research project. Are there parallels with your research?

W.B. Yes, what has already been said applies here too. Even the city of the future will undoubtedly be very digital, which is why we also refer to the "Smart City". Everything will be connected: traffic systems, energy systems and building systems. However, on the other hand, we are also considering how we can reduce roads by means of intelligent traffic systems and autonomous vehicles, save parking places and make traffic congestion-free. We wish to "green" roofs and façades, plant vegetables in the city and be able to live and breathe on the streets again. The Green City is an ambitious aim, in spite of all our intelligence and digitality.

Is there a backlash to the buzz words of the moment: digitalisation, Web 4.0, robotics and avatars?

W.B. Looking ahead I'm sure that this will come. Parcel delivery by drones, self-driving cars and robots that will relieve us of many chores. Avatars that will surf the internet for us and separate the sensible from the absurd before we have to deal with it. It will make us more productive, as it will relieve us of unpopular work, and ultimately make our lives easier. But we won't forget quite as quickly what grass feels like, how a wet plant smells and how beautiful a flower can be. And we will not forget how good a quality meal can taste. After all, we are humans, not machines.

PROF. DR. WILHELM BAUER



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PAUL HARTMANN AG

Task

To improve existing open-plan offices to become healthy workspaces – keeping them open-plan but providing options for employees to retire to a quieter space. A technical switchover to air conditioning is ruled out, not so much from an economic perspective but much more from an ecological one. The company's employees, as its biggest asset, are to play a key role at the specification stage.

Solution

Glass walls wetted on both sides with water maintain the transparency of an open-plan floor, regulate air humidity and reduce background noise. A green wall planted on both sides and a philodendron hedge harmonise the businesslike effect of the space and create a performance-enhancing indoor climate. This is a concept that provides for optimum air humidity, ensures oxygen production and successfully filters dust and viruses.





Facts & Figures

Address

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Joachim Vogel Director Business Services

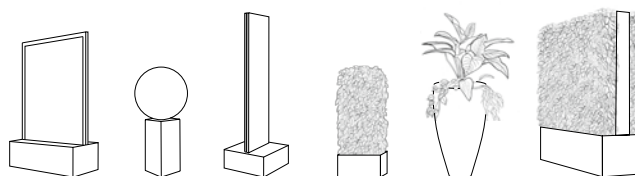
Type of space

Different open-plan spaces

Sector

Pharmaceutical company / Dressings

Products used



CARL ZEISS AG

Task

To design planting that gives a timeless and minimalist aesthetic to all prestigious and functional rooms within the company and improves the overall indoor climate. Pure green and minimalist ceramics harmonise in combination with the company's products, with the use of water creating a refreshing effect.

Solution

Solitary plants in minimalist stone ceramic containers give the space a pleasant feel and create an innovative and naturally green workplace. The thin-walled plant modules are space-saving and lighten the rather technical ambience, both in terms of their colour and the indoor climate. A highlight in the canteen area is the 36 m² high green wall, which significantly helps to filter out odours and dust.





Facts & Figures

Address

Carl Zeiss AG, Oberkochen

Contact | Architect

Günter Hermann, Dipl.Ing. Freelance architect BDA / DWB

Project Manager Markus Mehwald

Type of space

Open-plan offices, canteen

Sector

Lens optics

Products used



Efficiency, health and well-being do not mutually exclude each other, indeed are dependent on each other.

DR. PHIL. ANDREAS LIEBL

What motivates employees, based on all the changes in everyday work today?

A.L. Employees' basic needs have not changed much at all. However, the individual personality structures that there have always been are today encountering a different workplace. This workplace is shaped by new technologies and increasingly innovative knowledge work combined with complex and dynamically changing tasks and activities. This leads to special challenges when it comes to balancing work and private life. A genuine work-life balance is increasingly becoming a sign of individual success.

What needs do employees have today with regard to their "place" of work?

A.L. Undoubtedly employees have developed a strong sense of awareness of how their working environment is designed. The quality of the working environment impacts employees' identification with their company

and also symbolises the employer's appreciation of its personnel, its 'value creators'.

What are the major challenges of our time in relation to change?

A.L. To a certain extent changes in the working environment lead to increased mental pressure at the workplace. This trend has been visible for many years. Mental pressure is often referred to by the catch-all term 'stress'. We have to face up to this challenge with organisational and technological resources. This includes identifying the stress factors, including work aspects or social interaction, as well as the design of the working environment (acoustics, indoor climate, indoor air quality, lighting, plants and colours).

Do the old rules governing building architecture still have validity in relation to these changing requirements (indoor climate, acoustics, psychology)?

A.L. The changes in the working environment have undoubtedly also changed the requirements governing the design of the workplace, with the result that we still have a number of outdated policies and standards that have remained unchanged for decades. The responsible politicians, scientists and industrialists are aware of their responsibility, reviews are currently under way and old practices are being dispensed with. However this revision can often take longer than one would want it to, as the demands of the different interest groups have to be weighed up.

Which new aspects do developers, architects and designers have to take into consideration in their everyday work today that they did not need to two years ago?

A.L. We often forget that man is a being with very fundamental requirements when it comes to his environment. Modern communication systems complement, but do not



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replace, personal contact. Poor acoustics grate on the nerves and disrupt thought processes. Stuffy air (CO₂) makes people tired, and uncomfortable temperatures make them exhausted. Lighting not only affects vision, but the supply of daylight also affects psychological processes – sleep-wake rhythms – in the body. Natural elements in the workplace, like plants or water, have a measurable impact on indoor air conditioning and also have proven value in terms of relaxation. In recent years we have succeeded in quantifying these influences so that integral solutions can now be developed. We are addressing this issue in the Fraunhofer “Office Initiative”, a partnership between science and industry, with the aim of achieving a balance between efficiency, health and well-being.

What is the core finding from your many discussions with architects and consultants?

A.L. There is not a lack of willingness to break new ground nor a lack of technological

possibilities. To a far greater extent there is a lack of the right integration and weighting of the individual factors in the complex structure of workplace design to ensure that efficiency, as well as health and well-being, are guaranteed.

What should be the basis for our day-to-day work, according to the latest research findings?

A.L. Employees are the basis for the economic success of a company. Efficiency, health and well-being do not mutually exclude each other; by contrast they are dependent on each other. Employees and the design of their workplaces should not be regarded as a cost factor, as both represent the assets of each and every company.

What have been your own personal highlights in your work over the past two years?

A.L. I am very happy that more and more companies feel compelled to become the most

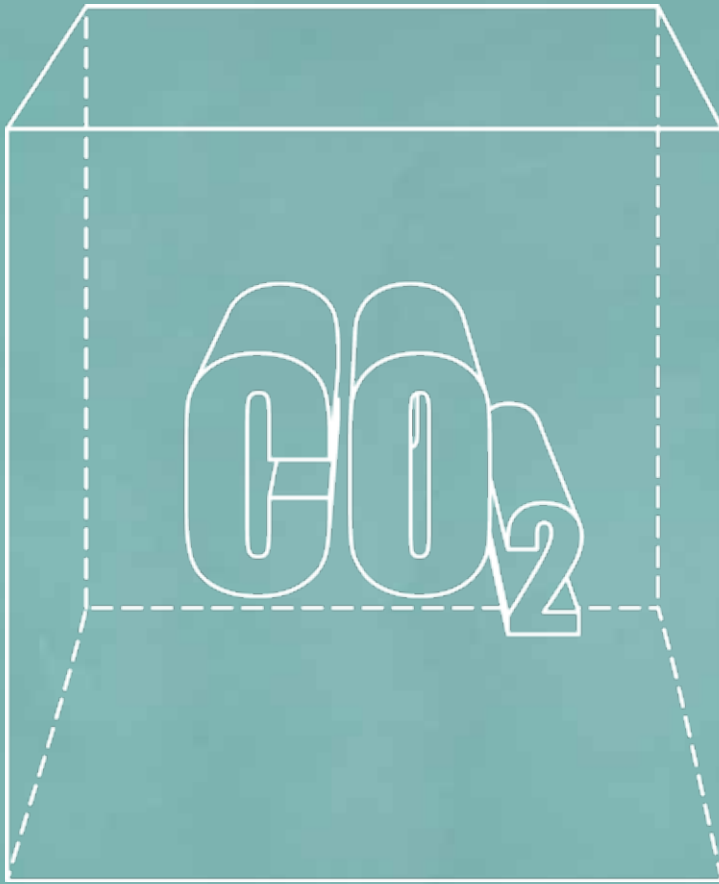
attractive employer for their staff and pursue this aspect on an equal footing to their economic interests. The best thing about this is that it represents a win-win situation.

WELL-BEING: FROM THE AIR!

Every day we consume around one kilogramme of solid food and around three litres of liquid food. And yet neither breakfast, lunch or dinner provide us with the most important of all “foods”: air. Every time we breathe, we take in around 500 millilitres of air. That means eight litres per minute and an impressive 10,000-15,000 litres in 24 hours.

However, we think very little about the quality of this mass volume indoors. Admittedly we cannot turn indoors into outdoors, as indoor air is especially astonishing, as we breathe around 90% of this volume indoors. Generally circulated, warmed and heated or air conditioned. However, our vertical gardens, Green Walls and hedges help to create a better quality of natural indoor air indoors.





approximately 15,000 litres of air



1 kg of solid food



3 litres of liquid food

EDAG PRODUCTION SOLUTIONS

Task

To design a green reference office that offers employees and companies the added value of a productive and pleasant working atmosphere. The aspect of health was to be specifically integrated in all workflows, including modern office equipment. Moreover, the company wanted to be able to react flexibly to different types of use.

Solution

The glass walls wetted on both sides by water and room partitions planted with philodendron improve the indoor climate and acoustics and have a calming and yet also stimulating effect on people's perception of their workplaces. Stand-alone structures, also wetted with water or planted with solitary plants or sansevieria, complete the ambience. The modular design permits structural freedom, at the same time constantly providing added value in terms of health.



Facts & Figures

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Dipl. Ing. Karen Wolf, Factory Designer

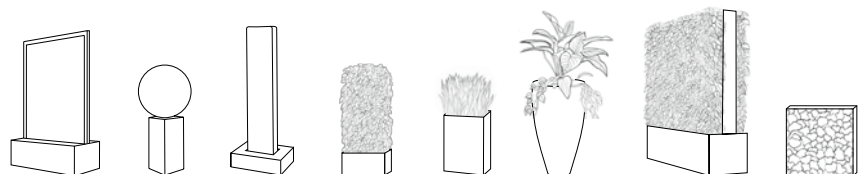
Type of space

Open-plan space for 80 employees

Sector

Automotive industry

Products used





REALISING THE HEALTHY OFFICE

At a customer's project



Without natural air conditioning.



CALCULATION BY A CONSTRUCTION BIOLOGIST

In this client project I have calculated all indoor factors and conditioned them accordingly. It was essential to improve the air humidity in the space. The following target values were calculated based on my calculations, delivering 45% air humidity, compared with the current 30%.

Implementation of the total office area (1150 m²) for 92 employees

| Element | Quantity | Individual evaporation / day | Total evaporation / day | Leaf and / or water surface area |
|----------------------|----------|------------------------------|-------------------------|----------------------------------|
| Glass module | 15 | 11.00 l | 165.00 l | 63.00 m ² |
| Philodendron hedge | 15 | 0.50 l | 7.50 l | 25.20 m ² |
| Philodendron element | 4 | 1.00 l | 4.00 l | 6.72 m ² |
| Green wall | 1 | 11.00 l | 11.00 l | 3.00 m ² |
| Plants | 6 | 0.25 l | 1.50 l | 12.00 m ² |
| Panel column | 2 | 6.00 l | 12.00 l | 4.20 m ² |

Total evaporation / day = 201 litres



With natural air conditioning

OUR PRODUCTS (EDITION)



Nova
52 x 177 x 52 cm



Calypso
52 x 180 x 52 cm



Square column
60 x 197 x 60 cm



Uranus
52 x 195 x 52 cm



Dancer
52 x 195 x 52 cm



Panel column
60 x 194 x 60 cm



Glass module 80
80 x 186 x 40 cm



Glass module 1200
120 x 186 x 40 cm



Glass column 600
60 x 196 x 50 cm



Sphere IV 50 31 x 31 x 51 cm
Sphere IV 60 31 x 31 x 68 cm
Sphere IV 70 35 x 35 x 78 cm



Moss Round
Ø 60 cm, Ø 80 cm,
Ø 100 cm, Ø 120 cm,
Ø 140 cm, Ø 220 cm



Moss Square
60 x 60 cm
80 x 80 cm
100 x 100 cm



Moss Rectangle
60 x 100 cm
80 x 120 cm
100 x 140 cm



Moss Bar
160 x 40 cm
200 x 60 cm
240 x 80 cm



Green wall 84 84 x 232 x 35 cm
Green wall 124 124 x 232 x 35 cm
Green wall 164 164 x 232 x 35 cm



GW Dual 124 124 x 158 x 40 cm
GW Dual 164 164 x 158 x 40 cm
GW Dual 204 204 x 158 x 40 cm



Hedge element, low base
79 x 40 x 39 cm / Overall 140 cm
Dracaena plant



Hedge element, low base
79 x 40 x 39 cm / Overall 185 cm
Philodendron plant



Hedge element, high base
79 x 75 x 39 cm / Overall 185 cm
Philodendron plant



Tondo 4 120 x 80 x 104 cm
Tondo 3 105 x 70 x 91 cm
Tondo 2 90 x 60 x 78 cm
Tondo 1 73 x 50 x 65 cm



Cono 6+++ 65 x 140 cm
Cono 6+ 45 x 110 cm
Cono 3+ 65 x 80 cm
Cono 3 60 x 65 cm



Oval 6++ 81 x 142 x 51 cm
Oval 6+ 64 x 118 x 40 cm
Oval 3+ 75 x 90 x 50 cm
Oval 3 62 x 77 x 38 cm



Cube 6++ 38 x 113 x 38 cm
Cube 6+ 38 x 75 x 38 cm
Cube 3+ 65 x 65 x 65 cm
Cube 3 50 x 50 x 50 cm



Rondo 6+ 45 x 110 cm
Rondo 6 37 x 92 cm
Rondo 3+ 70 x 80 cm
Rondo 3 60 x 65 cm

HOSOKAWA BEPEX GMBH



Task

To restructure the entire office space with transparent partitioning and improve air humidity in the workspaces. On the one hand, the design was to counter the typical character of open-plan offices and, on the other hand, health-promoting indoor climate functions were to be activated, particularly to combat air pollution by electronic equipment.

Solution

A six m² tall glass wall, wetted on both sides, combined with ten hedge modules and five stone ceramic pots produce the required natural air conditioning. Plant elements around photocopier stations prevent the spread of dust-filled warm air and also structure the office space to become a living balance of work and relaxation.





Facts & Figures

Address

Hosokawa Bepex GmbH, Leingarten

Contact | Architect

Wolfgang Pförsich, Managing Director

Type of space

Entrance foyer and open-plan office space

Sector

Mechanical engineering

Products used



BALANCED BUILDING

art aqua water features and Green Walls were developed in the knowledge that workspaces and living spaces equipped with areas of water and plants, can have a positive impact on the mind, body and soul. Experiencing nature creates equilibrium in the mind, while

the cleansing effects of the natural elements help to encourage physical regeneration. Reasons why art aqua water and plant installations individually help to promote a healthier indoor climate that encourages people to perform:



Improved room acoustics

The living and moving surfaces of art aqua products counteract annoying noise and reduce the noise levels perceived. Even resonance is reduced, as the free-standing plant and wall elements enhance the acoustically important distribution of absorption in the room. The intention is to create a design-led and effective compromise to typical acoustic absorbers. For example, the 2 cm thick moss has similar absorption properties to conventional porous absorbers, like mineral wool. The insulation provided by a planted art aqua hedge partition is comparable to a normal office partition wall.



Reduced cooling and heating costs

As a rule of thumb, heating costs fall by a massive 6% when the room temperature is lowered by only one degree Celsius. art aqua water features and Green Walls achieve this with the power of nature. And using green energy they also meet the approximate guideline figures for optimum room humidity. For perfect comfort and heating costs for your well-being.

- 24 °C room temperature at 40% rel. h.
 - 22 °C room temperature at 45% rel. h.
 - 20 °C room temperature at 50% rel. h.
- rel. h. = (relative humidity)*



Organism-friendly climate

Employers and employees benefit equally from this: absences due to colds are reduced, while performance increases thanks to improved concentration. All people in the building feel better because pollutants from electrical equipment, fine dust, ozone, noise, electrostatic charges and electrosmog, are filtered or reduced by the water features and Green Walls. Water is impressive as an energy carrier: we perceive humid air as being warmer than dry air and so the optimum comfort range for humans is between 50% and 60% air humidity – practically achievable with art aqua products.



Optimising air humidity

The air is often too dry in buildings, resulting in burning eyes and irritated mucous membranes. art aqua helps to combat this with applied passive evaporation and to promote healthy respiration by optimising the air humidity. From a physical perspective, this is achieved by independently balancing moisture between a humid surface and the drier ambient air (room air). This has several advantages over active evaporation: water vapour remains invisible, the atmosphere is sterile and there is also no need for the addition of energy.



Cooled and dehumidified indoor air

We are working on this with a Fraunhofer IBP patent: the water in the climate water wall is generally cooled to below 10 °C in summer. This means that the air passing the water wall is cooled and, when it falls below the dewpoint temperature of the air, the water vapour contained in it condenses as condensation on the surface of the water. The air is therefore actually dried by water and users enjoy the benefits of efficient and pleasant air conditioning, which also optimises the air humidity without annoying noises or draughts.



Production of oxygen and VOC filtration

Green Walls create an atmosphere not dissimilar to that in a park. They filter carbon dioxide (CO₂), carbon monoxide (CO), formaldehyde, benzene and phenol and thus cleanse the air of pollutants, viruses and odours, finally producing precious oxygen. This is how plants can improve the indoor air quality and help to prevent Sick Building Syndrome (SBS).



BOSCH

Task

Bosch Power Tools had several offices in Leinfelden which were to be united in an open-plan office. The aim was to create a work environment that provides a pleasant and healthy indoor climate. Despite the open-place concept employee privacy was also to be taken into account with top priority.

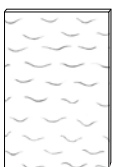
Solution

Through an increased emphasis on the digitalization process partly empty cabinets were made entirely obsolete. Instead, green hedges and modular water elements now grant an individual zoning among workplaces. Thanks to the redesign positive air, acoustic and climate values were achieved which equally entuses employees, partners and visitors. While green hedge elements symbolize growth, the customized water wall and glass modules stand for motion. A workplace surrounded by nature: Which other office employee can claim that about his workplace?



Facts & Figures

| | |
|----------------------------|-------------------------------|
| Address | BOSCH TOOLS LEINFELDEN |
| Contact Architect | Architekt MMV Consulting GmbH |
| Type of space | open space |
| Sector | Industrie |
| Products used | |





STÜCKI SHOPPING MALL

Task

To revitalise the established Stücki Shopping Centre, especially the food mall. Odours were to be contained, heat reduced, and pollutants and dust filtered better and naturally so that the quality of the shopping centre matches that of the food mall. A solution using water was preferably to be found.

Solution

A wave-like ring mains water wall with an open water surface is integrated into the dense architecture of the food mall. This extends over 260 m² of the food mall and creates an aesthetic structural component. All expectations regarding the cleansing of the polluted indoor climate are fully met and even the noise levels are reduced. A positive side-effect, of great benefit in the social areas of the mall.

Facts & Figures

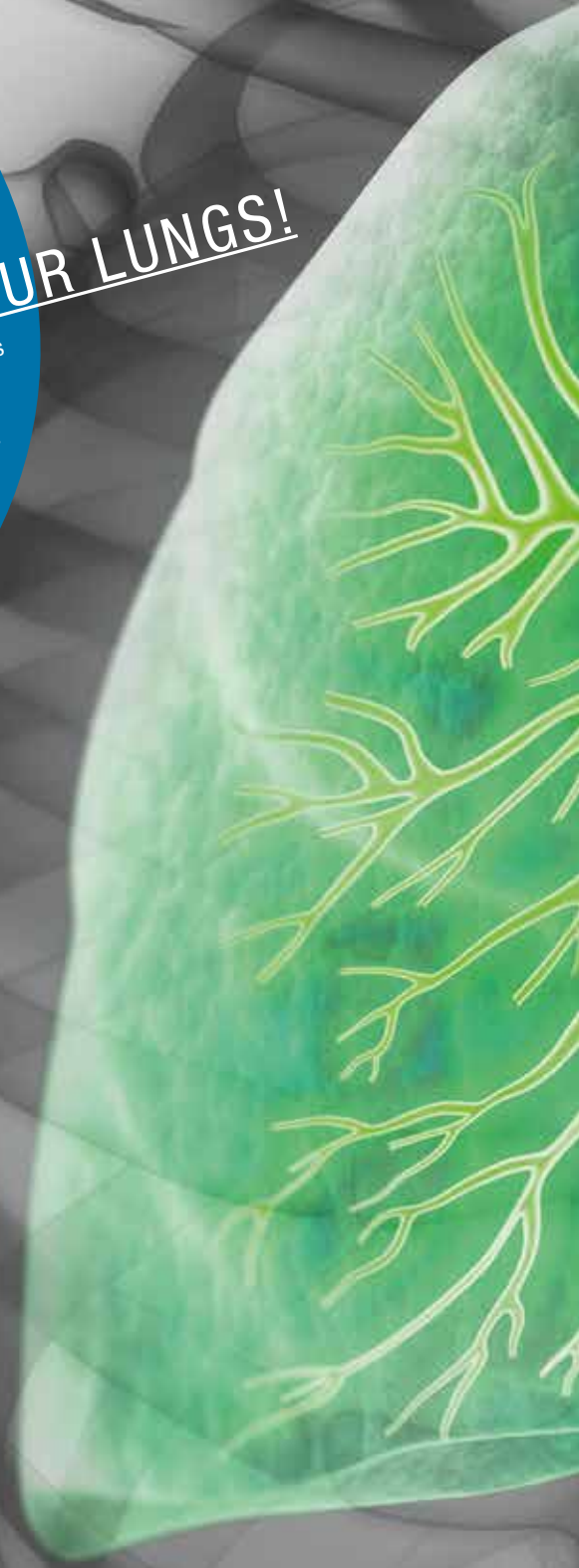
| | |
|----------------------------|--|
| Address | Stücki Shopping Mall, Basle |
| Contact Architect | SPS Immobilien / Bräunlin Kolb Architekten Ingenieure |
| Type of space | Central area of food mall |
| Sector | Shopping centre |
| Products used | |





Our indoor climate is generally too dry, too dusty and often carrying pollen or germs. Cold viruses and allergies thrive in these environments and the productive mind in the morning is yawningly empty by lunchtime. Dry heated air is the main reason for this as conventional heating and air conditioning systems do not humidify the air, simply drawing in room air, cooling it and noisily returning it to the workspace. Air literally becomes thinner and energy bills rise. The passive evaporation used by art aqua offers a number of benefits – above all it humidifies often dry air inside a building. Water vapour is invisible and germ-free with passive evaporation. That enables us to achieve an optimum air humidity of between 45-50%, most effective for the well-being and health of people.

HEALTH: INTO YOUR LUNGS!





HÖFE AM BRÜHL SHOPPING CENTRE

Task

To design an environmentally-conscious shopping mall, designed around ecological values, in the centre of Leipzig. The boulevard was to create a sophisticated ambience, including visual highlights and an air quality resembling walking through the forest on a summer day. Plants and water were to create an emotional link and accentuate the centre management's desire for sustainability.

Solution

As a counterpoint to the technical equipment, a 14-metre high water tower, a planted tower, two open reflective water pools, two horizontal planted areas and large-scale simply planted cubes interrupt the frantic traffic through the mall. They help to create relaxed shopping by filtering out pollutants and offering inviting seats and benches amidst the natural greenery.



Facts & Figures

Address

Höfe am Brühl Shopping Centre, Leipzig

Contact | Architect

MFI Management für Immobilien AG Essen

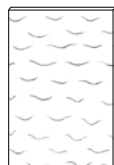
Type of space

The entire central zone of the shopping mall

Sector

Shopping centre

Products used





SÜDWESTBANK AG

Task

To revitalise the outdated interior of an existing building. The spacious but dark banking hall and adjacent, purely functional workspaces were to be redesigned as a modern, friendly and inviting space, including improved ventilation and using water as an aesthetic and sensory moment in the entrance foyer.

Solution

A 10 m² curved water wall made of blue stone, ribbon-like and at eye level, together with a 30 m² tall green wall give structure to the new consulting zone. In addition two curved water walls enhance the natural experience. The green wall, numerous hedge modules and planted ceramic stone amphorae solve the air conditioning problem in the rear window-free area.





Facts & Figures

Address

Südwestbank AG, Stuttgart

Contact | Architect

Ralf Mayländer, Director / Organisation

Johannes Ruf, Architect

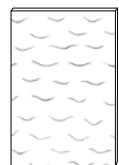
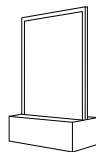
Type of space

Bank head office, counter hall, waiting areas and open space, employee offices

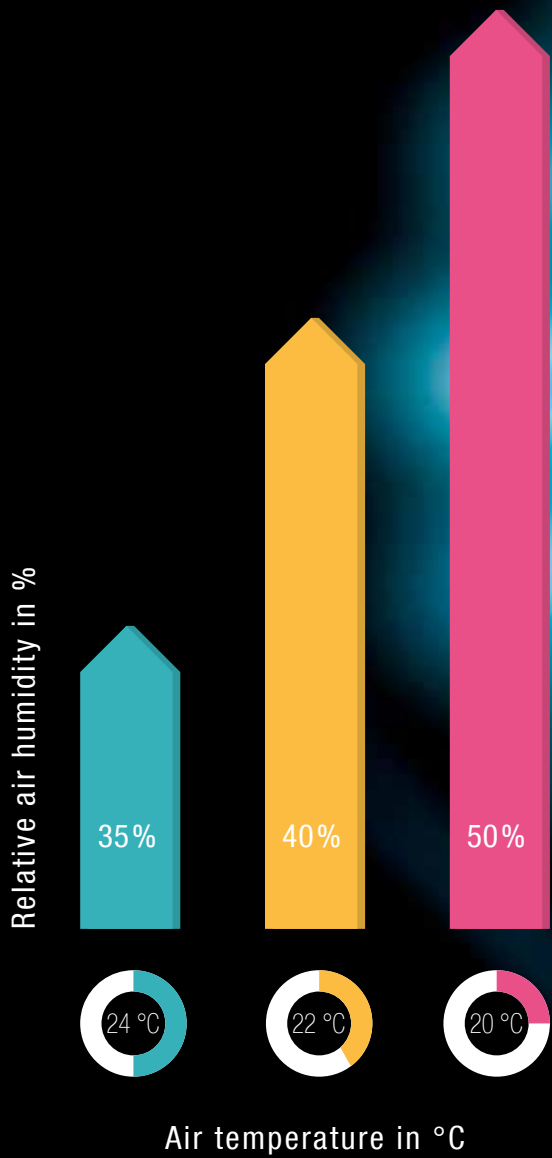
Sector

Private bank

Products used



Optimum air humidity guideline values to create an optimum feeling of comfort for people:



Measurably save costs and conserve valuable resources? Not a problem with art aqua. We guarantee not just a healthy indoor climate but also exemplary energy efficiency. After all, a comfortable indoor climate does not need high temperatures. Employees' thermal comfort and performance depends on what is known as the equivalent temperature in the room. It comprises the room air temperature, the surface temperatures of the surrounding areas and the air movements in the room. Our climate water wall helps to create optimum comfort reducing the cooling and heating output in summer and winter by 2-3 degrees. In the calculation, one degree Celsius lower means a cost-saving of around six percent. What is more, our climate water walls do not need more energy than other air conditioning units, around only one fifth of the usual output in a direct comparison. Everything achieved with fresh, natural air, which lowers CO₂ emissions and thus saves up to four-fifths resources in concrete terms.

EFFICIENCY:
WITH COST-EFFECTIVE
BENEFITS!

HUGO BOSS AG



Task

To create an indoor park in the atrium and improve the space around all workplaces to encourage people to work and meet and discuss with other people. Plants and water were to define the sense of space. The architectural design aimed for the highest award presented by the “German Association for Sustainable Building”. We were to create an urban working environment with living structures even in winter.

Solution

A multiple-stepped water course, planted plateaus and a six metre-high fig tree transform the covered atrium with wooden benches into an evergreen landscape. Irrigation is fully automatic and energy-efficient. Leafy sideboards bring life to workplaces, moss panels and plant arrangements bring a closeness to nature in high-occupancy areas.



Facts & Figures

Address

HUGO BOSS AG, Metzingen

Contact | Architect

Architekt Riehle + Assoziierte GmbH & Co. KG

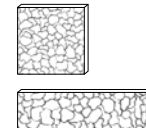
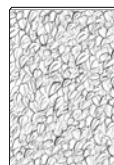
Type of space

Centre of building complex, open-space planting concept

Sector

Fashion

Products used





SPARKASSE ZOLLERNALB BALINGEN

Task

The primary concern is to upgrade the entire Management floor and entrance foyer. One focal area is the prestigious redesign of the entrance foyer to create a health-promoting and inspiring atmosphere, both for employees as well as for customers. The planting was to be aesthetically restrained, while the added value of the indoor climate was to be clearly tangible and measurable.

Solution

Planted floor areas embedded in stone and planted wall systems create an energy-giving ensemble for all floors. The beds planted with ferns and small hedges have a meditative effect, teamed with the stimulating green of the walls to produce an inspiring source for productive consultations. The innovations reduce heating costs and improve productivity.





Facts & Figures

Address

Sparkasse Zollernalb, Balingen

Contact | Architect

Architekt Till Wäschle

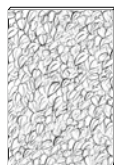
Type of space

Entrance foyer, Management floor

Sector

Banking

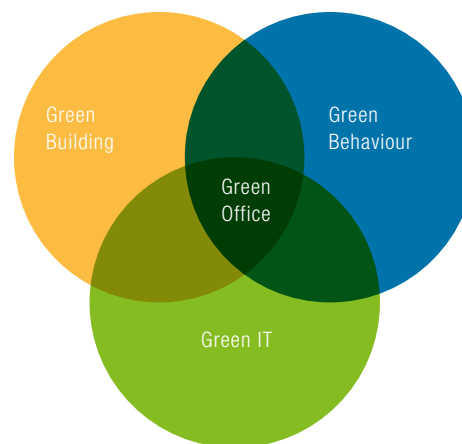
Products used



Motives, expectations and obstacles when introducing environmentally-friendly measures to design office work.

Green Office Study 2014, Fraunhofer Institute for Industrial Engineering IAO

Around 40 percent of employees in Germany work in offices. Based on this fact, eco-friendly solutions are not just growing in importance in production plants, but also play a key role in the design of workplace and office schemes. The Fraunhofer IAO refers to these workplace and office concepts based on environmental, economic and social objectives as “Green Offices”. This term refers to pure energy and resource efficiency, but also integrates concerted measures from three focus areas. Apart from sustainable information and communication technology (“Green IT”), “Green Offices” also use environmentally-friendly building and interior designs (“Green Buildings”) and rely on sustainable user behaviour (“Green Behaviour”).



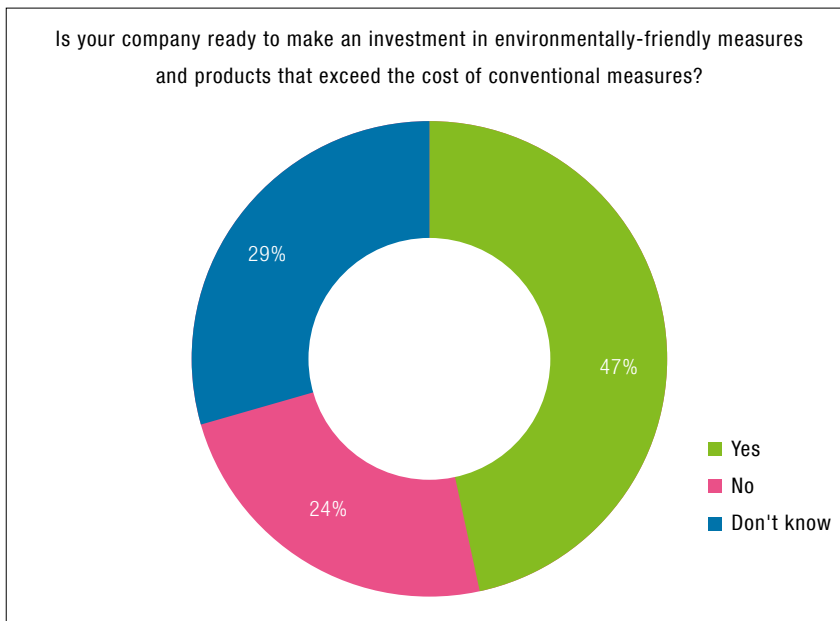
Source: Fraunhofer IAO,
Green Office Study 2014

The concept of “Green IT” also includes the eco-friendly production of equipment, such as notebooks or displays, as well as pure energy efficiency in the use of information and communication technologies. Due to the high rates of innovation and short life cycles, there also needs to be a focus on the materials used and their return to the material cycle with environmentally-friendly information and communication technologies; moreover, their energy-efficiency over their useful life also needs to be considered.

Offices are referred to as “Green Buildings” if they are built and operated economically efficiently and conserve resources. In addition, these buildings offer a high level of comfort to

users, are harmless to their health and blend perfectly into their neighbourhood environment. In addition to their sustainable building design, “Green Buildings” also include the environmentally-friendly interior design of the office environment. “Green Behaviour” involves users in the environmentally-friendly design. By doing so, the environmentally-friendly behaviour of office users presents significant potential for reducing energy and consumption of resources. However, the prerequisite for this is that the management, as well as each and every employee, signs up to environmentally-friendly concepts, solutions and products.

Willingness to invest in “Green Buildings”



Source: Fraunhofer IAO,
Green Office Study 2014

According to information from participants, just under half (47 percent) of companies are prepared to consider higher investment costs for eco-friendly “Green Building” solutions and products than for conventional measures. 24 percent are not prepared to spend more money on this and 29 percent do not know. Even in this case, participants in management positions are more often prepared to accept additional costs for environmental solutions (80 percent).

Conclusion

Sustainable workplace and office environments should not just be ecologically correct in terms of environmentally-friendly materials and products. Holistic approaches are also more successful and ultimately offers users the best possible benefits. Economical aspects, such as efficient use of space and productivity, and above all social concerns, like flexibility, communication, well-being and motivation, always have to have a central role alongside ecological aspects.



Facts & Figures

| | |
|----------------------------|--|
| Address | Hotel The Alpina Gstaad Six Senses |
| Contact Architect | Six Senses Architects |
| Type of room | Entrance foyer, lobby, spa and wellness area |
| Sector | Hotel |
| Products used | |





HOTEL THE ALPINA GSTAAD SIX SENSES

Task

To complete the SPA concept and appeal to the senses with flowing water and natural greenery. Both were to underpin the “unwinding” nature of the hotel. The integrated elements were also to be sustainable and perfectly enhance the indoor climate and yet be simple to maintain – aesthetically fill the room, yet be practical and restrained.

Solution

Four large water walls complete the SPA area design to offer sensory experiences with melodious rippling water, scenic waterways and aesthetically pleasing floor areas made of pale stone. A densely planted green wall transforms the lounge area into a zone close to nature, guaranteed to give guests a feeling of well-being, not least on account of its restorative humidity and sound-insulating planting.



ORTHOPAEDIC HOSPITAL

Task

To create an environment that is conducive to patient recovery, characterised by a contemplation of the natural world. A crucial condition was compliance with applicable hygiene regulations in hospitals. There simply could not be a danger of odours or harmful organisms being produced. The green environment was also to be combined with works of art.

Solution

A three-sided green wall in the Events area is reminiscent of forest air and meadows. The positive effects of this association are used to release regenerative forces. At the same time, the inorganic plant substrate prevents an unsanitary breeding ground being created. Colourful lighting features designed by Antje Sträter, image sails, plant features, a glass water wall in the restaurant area and a water cone in the atrium complete the feeling of well-being.





Facts & Figures

Address

Orthopaedic Hospital, Baden-Wuerttemberg

Contact | Architect

Olaf Sporys, Regional Director / Developer

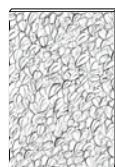
Type of space

Events area and restaurant

Sector

Large hospital specialising in surgery

Products used



RETHINKING THE CLIMATE

The indoor climate is becoming increasingly important to clients and users in terms of health, well-being and performance. Green Walls, vertical gardens, planted beds, water walls and water features offer a natural alternative to mechanical systems. Functions, such as indoor humidification, the purification of pollutants and the optimisation of spatial acoustics are benefits that can be achieved with the inclusion of natural air conditioning systems.

Architects and designers now have new options for creating attractive interior architecture that takes into consideration and integrates nature. Clients and operators can lower their operating costs, at the same time positively helping to maintain the value of the building. Natural air conditioning systems provide a balance to mechanical air conditioning systems, creating an indoor climate that focuses on health, well-being and performance.



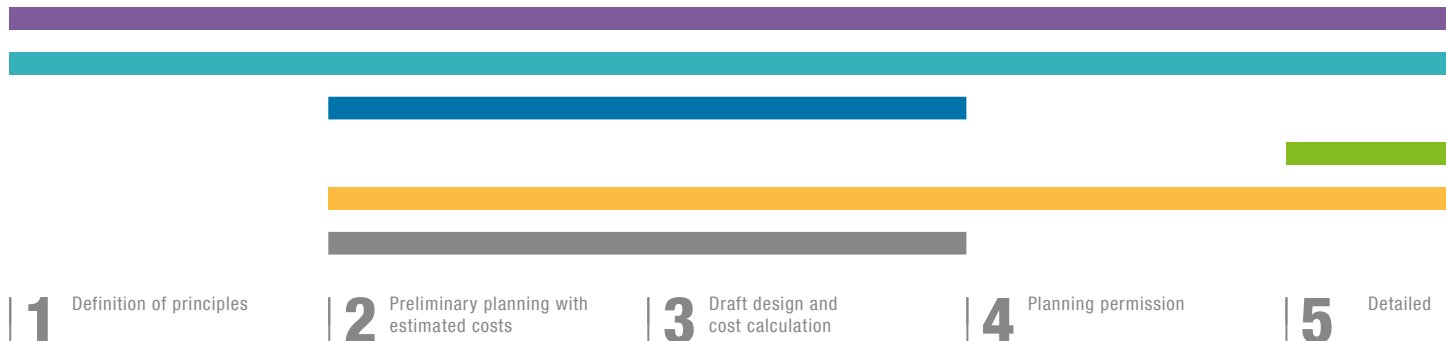
ARCHITECT

I am responsible for all phases leading to the perfect indoor climate and am the central contact for interior designs, design requirements and meeting the client's personal budget. That way ideas become reality.



CLIENT

I rely here on solutions that take different perspectives into consideration: design, health, efficiency and naturally the construction biological aspects. That way I can discover the best approach for me with experts at my side!



INTERIOR DESIGNER

I implement the interior design in consultation with the architect. I select the optimum materials and surfaces, present them to the customer, recommend types of plants, containers and features, thereby giving the future space its own identity.



CONSTRUCTION BIOLOGIST

My work involves conditioning the key factors in the space, that is conserving natural resources and ensuring a responsible approach to the environment. Only then will the customer obtain an indoor climate that is healthy and provides major ecological and economic benefits.



art aqua

In consultation with architects, construction biologists, interior designers and climate engineers, we develop the most efficient and effective solution for our clients. This can involve concepts integrated within the interior architecture or portable modules to ensure the desired indoor climate. By offering the client pilot installations, we offer them the security of investment they need in their choice of the right indoor climate concept.

CLIMATE ENGINEER

I plan the perfect indoor climate independent of internal heat sources and external loads. Together with construction biologists I adjust the temperature, air humidity and air quality and combine all key aspects in a health-promoting balance to create a comfortable interior 365 days a year.



| | | | | |
|----------|---|---|--|-------------------------------------|
| planning | 6 Tender preparation, contract specification | 7 Involvement at the tendering stage | 8 Monitoring of the project & documentation | 9 Supervision of the project |
|----------|---|---|--|-------------------------------------|

Legal Notices

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Sources

Page 8

Biophilia

C 2012 Terrapin Bright Green LLC
C 2013 Hermann Miller, Inc. Zeeland Michigan
www.terrapinbrightgreen.com/report/economics-of-biophilia

Page 9

Aesthetics of Office Environments

Fachhochschule Erfurt, University of Applied Sciences
Study on the Hedonomic Factors of Office Design

Design as a Factor for Success

Graphics: vitra Office Style Guide, Das Arbeitsbuch

Page 52

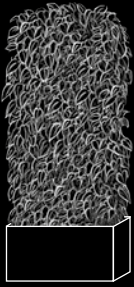
Motives, expectations and obstacles when introducing environmentally-friendly measures to design office work.

Green Office Study 2014, Fraunhofer Institute for Industrial Engineering IAO

Subject to changes.

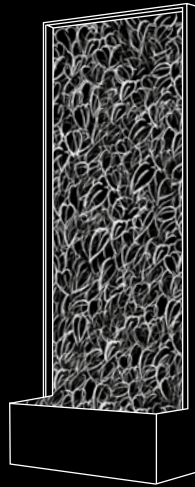
Illustrations may differ.

THE ELEMENTS



Hedge element, high base

2.4 m² = Leaf surface 10 m²



Green wall

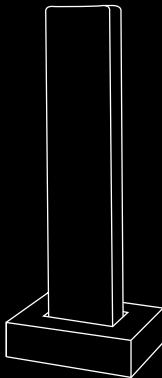
evaporation 11.5 l / day

2.8 m² = Leaf surface 9 m²



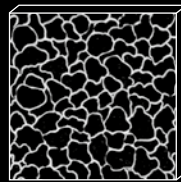
Plant container J6 / Philodendron

Leaf surface 2 m²



Rectangular column

1.5 m² evaporation = 8 l / day



Moss Panel Square

Sound absorber



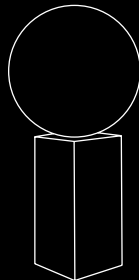
Sideboard element

Leaf surface 2 m²



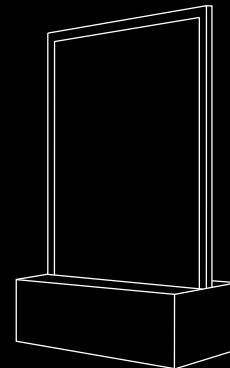
Floor greenery

1 m² evaporation = 3.5 l / day



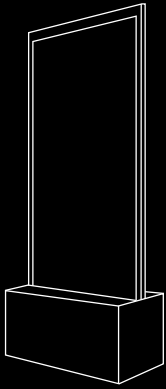
Sphere

1.2 m² evaporation = 6.5 l / day



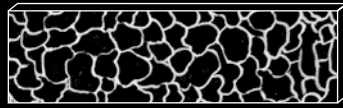
Glass module 1200

3.1 m² evaporation = 17 l / day



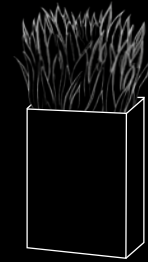
Glass module 800

💧 2.4 m² evaporation = 12l / day



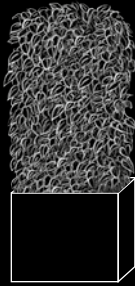
Moss Panel Rectangle

🎧 Sound absorber



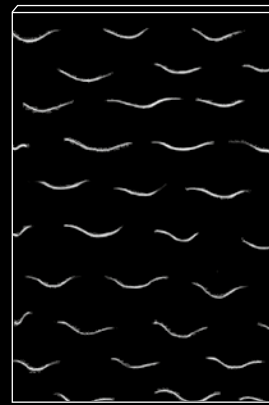
Cube 2 / Sansevieria

🌿 Leaf surface 4 m²



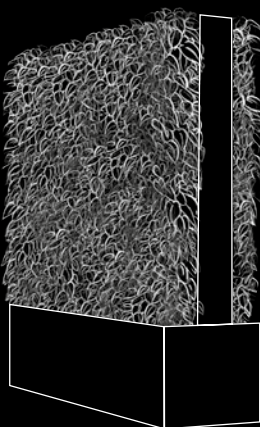
Hedge element, low base

🌿 1.8 m² = Leaf surface 7 m²



Water wall, individual

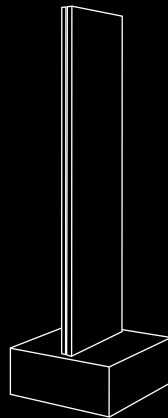
💧 1 m² evaporation = 5.5l / day



Green wall Dual

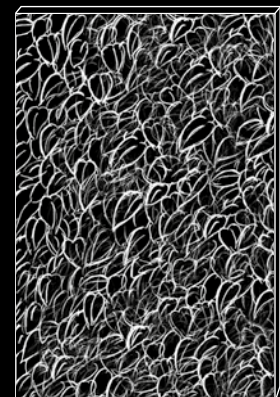
💧 4.6 m² evaporation = 16l / day

🌿 4 m² = Leaf surface 16 m²



Panel column

💧 1.8 m² evaporation = 9.5l / day



Green wall individual

🌿 1 m² evaporation = 3.5l / day



**“SUSTAINABILITY IS CONSIDERING THE OUTCOME
OF EVERYTHING WE DO.”**

Eric Schweitzer (*1965), ALBA CEO