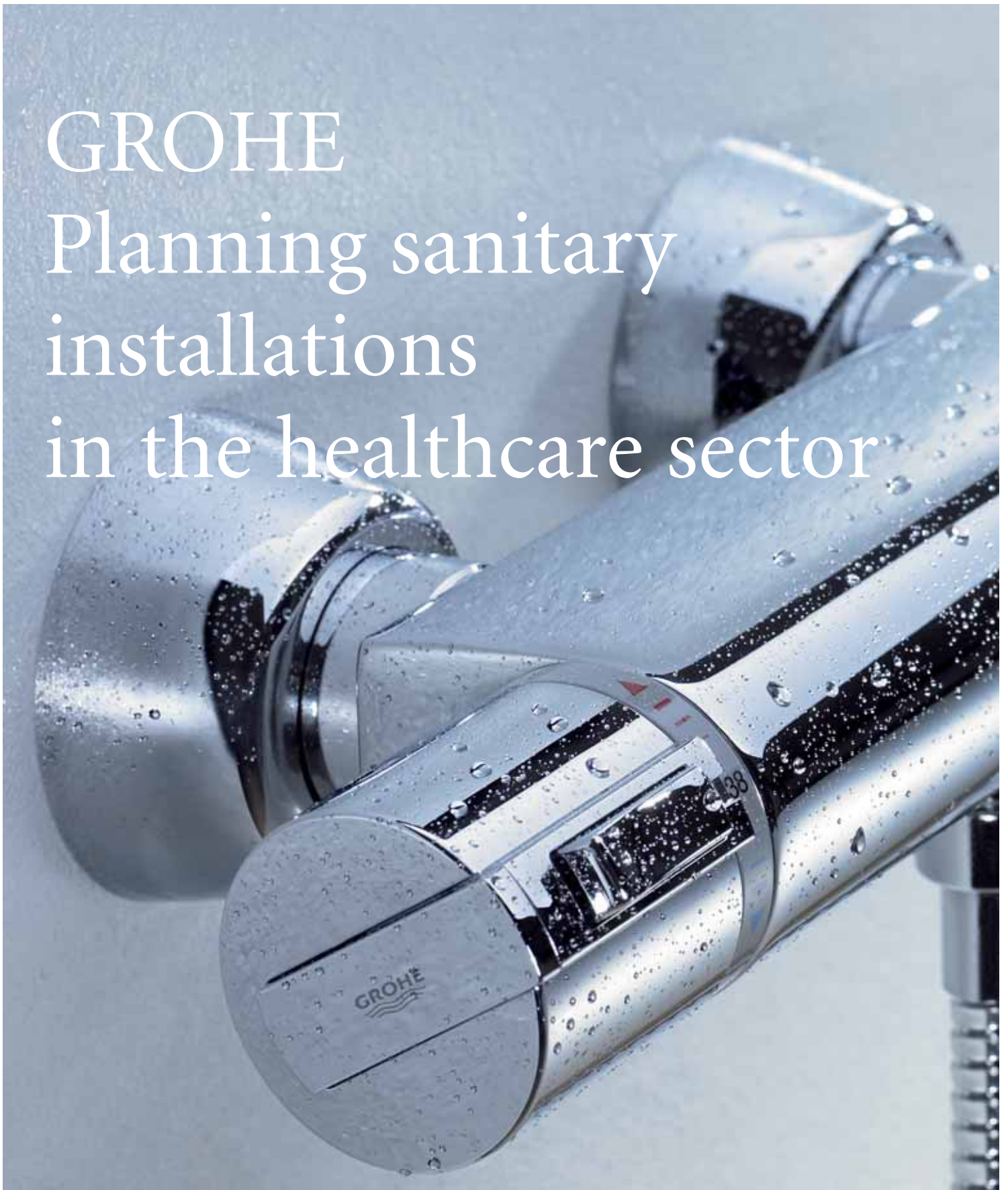


GROHE

Planning sanitary installations in the healthcare sector





The healthcare sector poses particular challenges for drinking water installations

The moment of truth comes whenever users put a product to the test in everyday life, comparing its advertised features with its actual performance. This is why GROHE has summed up the special qualities and benefits of its products in a set of unique “Moments of Truth” which tell consumers and professional users exactly what to look forward to in a given GROHE product. Here is a short overview:

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for a long-lasting high-quality chrome finish.



for effortless, precise operation of the single-lever mixers.



for a perfectly full spray pattern from head showers and hand-showers.



prevents the thermostat surface from overheating and protects from scalding.



for a constant water temperature maintained by high-tech thermostats.



reduces the sound of the flush to an absolute minimum so as not to disturb fellow patients and residents.

Challenging circumstances call for special solutions. This is why a set of additional standards has been defined for the use of GROHE products in particular environments including the healthcare sector. These stringent standards testify to the exceptional quality and durability of these products.



facilitates regular thermal disinfection.



uses an easily adjustable mechanism to limit the maximum water temperature on one-hand mixers.



allows many faucets to be operated ergonomically e.g. using one's elbows.



ensures more intuitive operation e.g. through more easily legible scales on thermostats.



limits the radius of swivel spouts to prevent flooding.



highlights the use of massive stainless steel as the main material.

These unique features help planners and operators appreciate the added value delivered by GROHE products in professional long-term use.



Clean solutions for the “hospital of the future“

Health, our most important asset, requires a sound environment. Water supply systems in healthcare environments, in particular, must not become a breeding ground for infectious diseases. This belief is shared by Menhard Schoof, the project engineer supervising the outfitting of the new building erected for the Johannes Wesling Klinikum hospital in Minden, Germany. Because of its clear focus on optimised work routines, experts consider this new facility a model for the “hospital of the future”.



Menhard Schoof
Project engineer
Johannes Wesling
Klinikum,
Minden/Germany

The traditional ward structures have been broken down in favour of cross-disciplinary units and centres. Patients benefit the most from the short distances and reduced waiting times. “Apart from enhanced convenience, however, our overall plans are geared to safety”, says Menhard Schoof. “Scalding protection and simplified thermal disinfection were two of the aspects we attached particular importance to when it came to specifying the fittings and faucets.”

Hygiene and safety also play an important role for the touchfree GROHE fittings in the operating rooms of the Johannes Wesling Klinikum. According to Menhard Schoof, the GROHE products installed here also offer a clear advantage in terms of long-term maintenance: spare parts compatibility. Considering that some 2,000 faucets and fittings are installed in the complex, this makes for a convincing argument.

Operating rooms: Highest standards of hygiene

Creating and maintaining a sterile environment is a top priority particularly in surgical environments. This is vital not only in operating rooms which are used on a daily basis but also in rooms where only occasional operations are performed. In the latter case, it is important to prevent water stagnation in pipes which might otherwise become affected by biofilms providing a fertile breeding ground for legionellae. Appropriate measures need to be taken to ensure the highest standards of hygiene here.



1 Infra-red electronic for wash basin with thermostat 2 Infra-red electronic for wash basin, concealed 3 Infra-red electronic for wash basin without mixer

◀ Nepomuk Klinik, Erfurt

Europlus E

The Europlus E is an electronically controlled faucet for touch-free operation. This GROHE faucet uses an infra-red beam which detects an approaching hand or body. The Europlus E's special features include a programmable automatic function which triggers regular flushing cycles, thereby contributing to a high standard of hygiene even in infrequently used operating rooms.

The thermostat handle allows for simple and reliable temperature settings, thereby obviating the need for readjustments - a source of recontamination - during scrubbing.

To simplify the regular thermal disinfection, GROHE has redesigned the process for dismantling the handle and unlocking the thermostat - a renewed adjustment is no longer required.

The Europlus E is available in two variants. The exposed version of the wall-mounted fitting comes complete with a thermostat and a swivel spout. As an alternative, a concealed version made of solid stainless steel (**GROHE RealSteel**) can be specified.

Ergomix

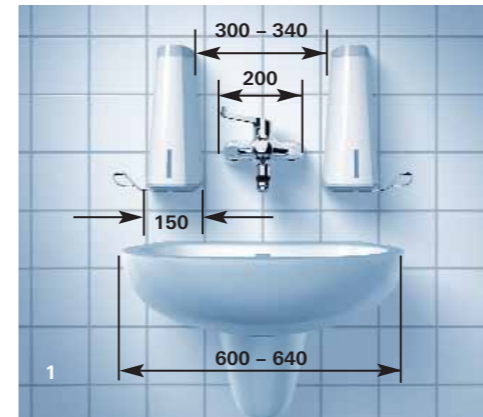
The Ergomix faucet combines hygiene and functionality not only in doctors' surgeries but also in operating rooms (photo far left). Its key features include the long lever for elbow operation as well as thermostatically protected temperature selection.

- long operating levers or:
- touch-free control
- automatic flushing
- regular thermal disinfection

“Outstanding” ergonomics

The wall-mounted Grohtherm Ergomix has been developed especially for use in examination and treatment rooms in hospitals and doctors’ surgeries. This thermostat faucet offers “outstanding” ergonomics by way of its long lever and the **GROHE ErgoPlus** metal wing handle which allows users to control the water flow with their elbows. In addition, the front-operated thermostat is perfectly positioned for quick and easy temperature settings. The unit incorporates a **GROHE TurboStat**®thermoelement which automatically balances out pressure fluctuations in the pipes to protect the user against scalding.

Apart from the obvious operating convenience, the highly ergonomic position of the thermostat handle is also particularly space-saving and permits to mount soap and disinfectant dispensers at a small distance from the mixer.



1 Space-saving thermostat operated from the front 2 Adjustment safety stop 3 Thermal disinfection

Full control on a single level

The Euroeco Special SSC mixer from GROHE is engineered to offer convenient access to water at all times. Its design is based on extensive studies of doctors’ and medical personnel’s day-to-day working routines.

Even when operating the lever and the **GROHE ErgoPlus** metal wing handle exclusively with their elbows, users immediately have full control over the flow and temperature of the water. All lever movements are strictly horizontal without requiring any upward or downward movements. While a turn to the left releases the cold water flow, a turn to the right mixes hot water into the flow. The farther the turn, the warmer the water becomes. The standard-fitted laminar flow straightener also helps to prevent airborne bacteria from being sucked into the water flow.

The wall mounted Euroeco Special SSC mixer makes for a tidy wash basin top and is available either with a fixed spout or with a swivel spout. Various deck-mounted versions are also available, including models with different lever lengths.

- ergonomic operation
- thermostatic safety feature
- space saving installation

Get well soon!

Optimal water supply for hospital patients and care home residents

Safe, simple and self-explanatory - this is the maxim for designing faucets and fittings installed in bathrooms for hospital patients and care home residents. This requirement extends from wash basin taps to shower and toilet fittings. Different faucet solutions - pillar taps or wall-mounted units - are available depending on the types of wash basins provided. What counts is that the lever and spout lengths are optimally matched to the position of the drain and the specific user needs (ergonomics). Thermostat-equipped fittings offer the best possible protection against scalding under the shower.



Effortless flushing

The Skate WC actuation plate is a perfect choice for patient rooms and care homes. Its special design permits users to actuate the flush also with their lower arm, their elbow or the back of their hands. Its unique functionality earned it an award from the Iserlohn-based Gesellschaft für Gerontotechnik (GGT, Society for Advancement of Technology for the Elderly) as well as the coveted GGT seal testifying to its particular suitability in barrier-free environments.



Optimum leverage at all times

Hospital patients, nursing care patients and the elderly require ergonomic faucets and fittings. The Euroeco Special mixer can be fitted with levers of various lengths and is optionally available as a wall-mounted mixer and as a deck-mounted mixer. To ensure optimum user protection, it is advisable to install an upstream Grotherm Micro thermostat (see page 20).

- long operating levers at the wash basin
- shower thermostats
- effortless WC actuation

Removing barriers - providing uninhibited access ...

Bathrooms for mobility impaired persons put a premium on particularly careful planning. Apart from avoiding structural barriers, smart solutions should also be specified for all water controls in order to ensure maximum user convenience. Safe and comfortable operation are of the essence here.



Planning bathrooms for mobility-impaired users

Completely level floors in sanitary areas have proven so useful that they are nowadays even specified in private homes. Roll-in showers have become a standard feature in healthcare facilities which are obliged to offer access also for handicapped people. GROHE strongly recommends to equip all barrier-free showers with thermostat shower fittings which offer the best possible protection against erroneous operation and scalding in case of a cold-water supply failure. GROHE thermostats use high-tech thermoelements to balance out any pressure fluctuations in the pipe in virtually no time at all. In addition, modern GROHE thermostat fittings feature the proprietary **GROHE CoolTouch®** technology which shields the exterior surface of the fitting against the hot water flowing through the inside of the fitting. A similar design is employed in GROHE handshowers to isolate the shower housing against the hot water ducts running through it. Features such as these help to ensure that a safe and comfortable showering experience can even be enjoyed by persons with mobility impairments or reduced sensory capabilities. Contemporary planning should also provide for grab handles and a user-friendly shower seat installed at a height which allows to reach the shower controls comfortably. The positions and heights of the fittings and controls need to be planned with this in mind and appropriate behind-the-wall installation elements need to be specified.

Easy-to-reach flush actuation

Toilet bowls need to be placed higher to facilitate use by wheelchair-bound persons and elderly people. Rapid SL installation elements from GROHE make it easy to meet all requirements in terms of height, load bearing and projection. GROHE recommends specifying touch-free WC actuation systems which offer an optimum solution both in terms of hygiene and user comfort. Electronic flushing systems such as Tectron Skate respond to actual usage and present a smooth and easy-to-clean surface. As an alternative the flush can be triggered by radio control. The required push button may be placed either on the wall or on one of the grab rails on either side of the toilet. Offering effortless actuation, "Skate" actuation plates with large operating buttons are well suited to barrier free environments too.

Perfect hand-washing hygiene for all

To be wheelchair-accessible wash basins need to be installed at a particular height. Behind-the-wall installation elements from GROHE accommodate this extra installation height without any problem. Touchfree electronic faucets such as Europlus E (backed up by a Grotherm Micro thermostat, see page 20) are recommended to ensure optimum user comfort and safety in this area.

- create a level floor
- enhance user comfort
- simplify operation

Optimum hygiene for patients, visitors and staff ...

Public bathrooms in hospitals, care homes and other healthcare facilities require specific hygiene management because such areas are typically frequented not only by visitors, but also by patients, residents and at times, medical personnel.



- high standard of hygiene
- economical water consumption
- reduced cleaning effort

Touchfree technology promotes hygiene

To rule out the transfer and spreading of germs to the extent possible, the sanitary installations in such public and semi-public washrooms have to meet particularly high standards of hygiene. Wash basins should be fitted with touchfree electronic faucets. GROHE recommends specifying the Europlus E as a pillar tap. This faucet reacts automatically as soon as it is approached by a hand or arm. The water flow is stopped after a preset period (or after a preset quantity of water has been dispensed). This technology makes the Europlus E a perfectly hygienic facility for its users and a highly economical solution for its operator.

Automatic flushing

Superior hygienic protection compared to conventional flushing valves is also provided by touchfree flushing systems fitted to urinals in public restrooms. The Tectron infra-red electronics developed by GROHE can even be programmed to perform regular routine flushes in addition to the flush triggered after each use. In addition, GROHE offers roughing-in sets for the efficient conversion of existing GROHE urinal flush valves to touchfree operation based on an infra-red beam.

Economy and easy cleaning

The Skate Air WC flush actuation plate (see photo on adjacent page) offers a start & stop function as well as a choice between two flushing volumes. This allows users to economise their use of the world's most vital resource. Its smooth surface makes this actuation plate particularly easy to clean as well.

Overview: Sanitary products for use in healthcare environments

Wherever water has to be dispensed in a healthcare environment GROHE offers solutions which meet all site-specific needs. These needs vary depending on the mobility status of the users. Key aspects to be taken into consideration by planners include ergonomics (easy handling and control) and safety (e.g. scalding protection, germ transfer avoidance through touchfree operation).

GROHE basin mixers are available both in deck-mounted and wall-mounted versions. Spouts and operating levers of different lengths can be specified. This not only facilitates their use both in low-barrier and barrier-free environments but also allows for optimum matching of different basin and faucet types.

Wash basin



33 118 000 Euroeco Special
Single-lever basin mixer grande, 1/2", laminar flow straightener 9l/min., adjustable flow rate limiter, metal lever 100 mm, temperature limiter, pop-up waste set



33 126 000 Euroeco Special
Single-lever basin mixer, 1/2", wall mounted, laminar flow straightener 9l/min., adjustable flow rate limiter, projection 153 mm, metal lever 100 mm, temperature limiter



34 023 000 Grohtherm Micro Special
Thermostatic scalding protection / Under-basin thermostat for mounting on top of the angle valve

47 533 000 Connection set
for mixer-type fittings



33 122 000 Euroeco Special
Single-lever basin mixer, 1/2", laminar flow straightener 9l/min., adjustable flow rate limiter, metal lever 100 mm, temperature limiter, pop-up waste set



33 130 000 Euroeco Special
Single-lever basin mixer, 1/2", wall mounted, laminar flow straightener 9l/min., adjustable flow rate limiter, lockable cast swivel spout, projection 249 mm, metal lever 170 mm, temperature limiter



36 207 000 Europlus E
Infra-red electronic basin mixer, 1/2", battery supply, type of protection IP 59K, automatic flushing and permanent flow mode for thermal disinfection can be activated

Shower



34 205 000 Grohtherm 2000 Special
Thermostatic shower mixer, 1/2", GROHE CoolTouch® safety housing, volume handle with individually adjustable economy stop, mousseur aerator, temperature scale handle with safety stop



28 666 000 Relexa shower bar, 600 mm, with wall holders, glide element and swivel holder, GROHE StarLight® chrome finish



28 537 000 Relexa handshower, low aerosol emission, 1/2", GROHE StarLight® chrome finish



28 151 000 Shower hose Relexaflex, 1,500 mm, 1/2" x 1/2"



19 416 000 Grohtherm 2000 Special
Thermostatic shower mixer, set for final installation for 35 500 000, without concealed body, temperature scale handle with safety stop, volume handle with economy stop

35 500 000 Grohe Rapido T
Universal Thermostatic mixer for concealed installation, without shut-off device, concealed body for 19 416 000, without finishing trim set



28 545 000 Head shower low aerosol emission, 1/2", GROHE StarLight® chrome finish



28 626 000 Shower outlet elbow, 1/2", male thread, GROHE StarLight® chrome finish

Elements for concealed installation



38 625 000 Rapid SL
for wash basin, for single-hole installation or wall-mounted fittings, with concealed drain trap, with adjustable outlet bend, chrome plated, 1.20 m installation height



38 675 000 Rapid SL
with flushing cistern 6 l, dual flush/start & stop/single flush, connection from the rear, 1.20 m installation height, 0.42 m wide, for WC bowls 70 cm projection, installation height 46 cm, for the disabled

WC electronics



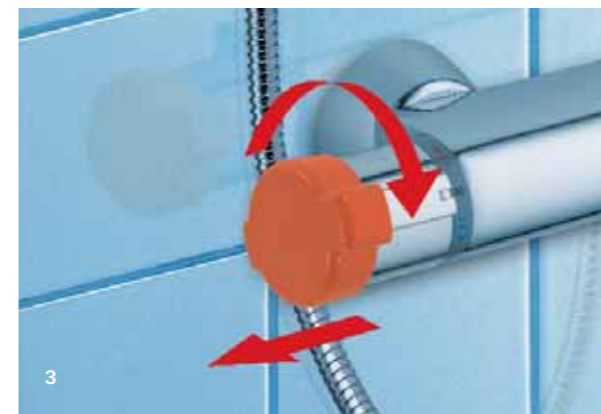
38 698 SD0 Tectron Skate
for flushing cistern GD 2, concealed installation, infra-red control, 230 V AC, servo motor, cover plate stainless steel



38 699 Tectron Surf
for flushing cistern GD 2, concealed installation, infra-red control, 230 V AC, servo motor, cover plate chrome

Basic information to be taken into account when planning drinking water installations in the healthcare sector

In addition to the official standards and guidelines detailed on pages 24-31, GROHE offers planners and operators practical tips and recommendations derived from long-standing experience with GROHE sanitary products installed in a wide variety of healthcare facilities. These tips centre on the aspects of hygiene, ergonomics and economical use of water.



1 Put on cap and turn 2 Wait for thermal disinfection (70°C hot water flows through the fitting for three minutes) 3 Turn back and take off cap

No chance for germs

Thermal disinfection of supply pipes and fittings is widely used as an effective measure against potential sources of infection in drinking water installations. Water heated to a temperature of 70°C is killing potential pathogens like legionellae and removing biofilms and other undesirable deposits from the pipes.

GROHE SafetyPlus greatly facilitates thermal disinfection routines. The fitting is set for thermal disinfection in next to no time. Subsequent readjustment of the thermostat is not required.

Touchfree faucets and fittings using infra-red detection technology allow users to avoid direct contact with potentially contaminated objects such as operating levers and handles. In addition, the integrated electronic control units permit programming regular automatic flushes to prevent stagnation of water.

The special GROHE faucets and fittings offered for healthcare installations feature particularly smooth surfaces and high-quality rosettes to prevent soiling and germ deposits. This makes for easy cleaning and reduced cleaning efforts compared to standard faucets and fittings.

- simplified processes for regular thermal disinfection
- smooth surfaces to prevent germ deposits
- avoiding contact with potentially contaminated objects

Safety first: Thermostats for effective scalding protection

Hospitals, care homes and other healthcare facilities frequently use hot water temperatures in excess of 65 degrees centigrade which means that users are exposed to a particular risk of scalding. The European DIN EN 806-2 standard defines the applicable planning guidelines for scalding protection in drinking water installations.



1 Temperature adjustment using Allen key 2 Re-attach scale ring



Safe water regulation and scalding protection to DIN

The DIN EN 806-2 standard requires protection against scalding through hot water or hot fitting surfaces. GROHE thermostats such as the Grohtherm 2000 feature a special function to limit the maximum temperature as well as the **GROHE CoolTouch®** function that keeps the thermostat surface from overheating.

Engineered for effective protection

All GROHE thermostats are based on the **GROHE TurboStat®** technology that mixes cold and hot water reliably and constantly as desired. These thermostats react instantly to temperature and pressure changes and balance them automatically. In case of a sudden cold water disruption, e.g. due to a burst in a water pipe, this sophisticated technology stops the flow immediately to rule out the risk of scalding from unmixed hot water.

1 + 2 **GROHE CoolTouch®** technology

- planning principles in DIN EN 806-2
- thermostats ensure constant water temperatures
- shielding users against hot water

Safety

Practice-proven technology.

Sanitary fittings installed in hospitals, clinics, medical practices and care homes are subject to heavy day-to-day use. These fittings need to be engineered for longevity in order to ensure long-term economic benefits and reduced consumption of resources.

Ergonomics play an important role as well. Faucets should be designed for uninhibited access and barrier-free use by all. They should also encourage intuitive operation as a contribution to greater safety and quality of life. All functions should be clear at first sight so that users need to complete only a very flat learning curve.



Managing water consumption: Infra-red beam ensures economical use of water

Europlus E from GROHE uses an infra-red beam to detect a hand approaching the faucet and to dispense water as needed. The flow of water is stopped automatically after a preset time or after a preset amount of water has been dispensed.

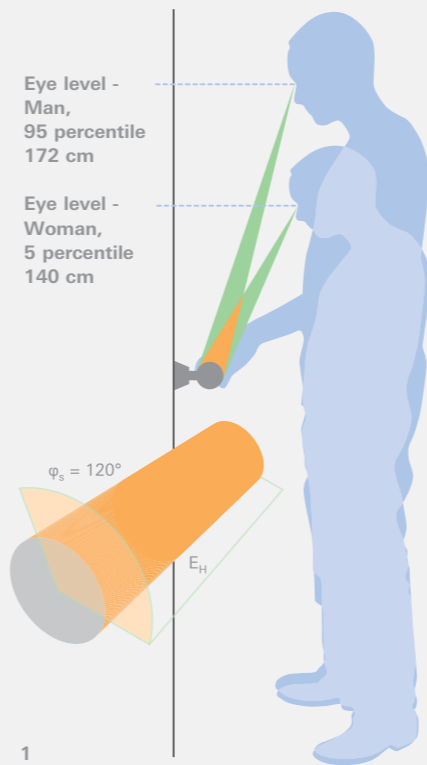
This makes the Europlus E particularly suitable for healthcare facilities where patients' or care home residents' ability to operate faucets is impaired due to physical or mental handicaps. As is the case in the "Hausgemeinschaft für Menschen mit Demenzerkrankung" (care home for dementia sufferers) in Otto-Kilian-Strasse in Halle an der Saale in Germany. All resident rooms in this care home were fitted with electronically controlled Europlus E faucets in 2002.

Given that care home residents suffering from dementia frequently forget to turn the faucet off after use, the installation of the Europlus E faucets has led to a clear reduction in water consumption. "While we do not have historical figures which would allow for an exact comparison, we estimate that the installation of the electronic fittings has reduced basin-based water consumption by more than half", says Stefan Makiola, head of property management and domestic services at Paul-Riebeck-Stiftung, the foundation running the home. As residents usually use mixed water, the savings are even greater due to the lower energy costs associated with water heating.

The foundation has therefore decided to have Europlus E faucets installed also in all 60 resident rooms at its "Haus der Generationen" care home.

1 + 2 Care home for dementia sufferers in Halle an der Saale, Germany

Scale always in sight



1 Scale always in sight
2 Scale ring

It's only logical

Medical personnel have little time for hand sterilisation especially in emergency situations. This is why it makes sense to install faucets and fittings which are designed for fast and no-fuss operation. Activated by infra-red beams and fitted with integrated thermostats, the Europlus E wall-mounted mixer and the Euroeco Special mixer fully meet this requirement.

Ergonomics are also an important consideration in day-to-day operations of hospitals, doctors' surgeries and care homes - particularly in facilities for patients and residents with mobility impairments or reduced sensory capabilities. Shower thermostats, in particular, need to be easy to understand and use. This is where **GROHE EasyLogic** comes in to ensure intuitive operation through such features as clearly legible scales on non-dazzling surfaces which remain within the user's field of vision even when fully turned.

Simple operation and smooth handle action are important advantages also in basin-mounted faucets. All GROHE single-lever mixers are fitted with particularly smooth moving cartridges. The **GROHE SilkMove**® technology uses a space-proven ceramic alloy to ensure silky smooth lever action for many years to come, thereby permitting to set the temperature effortlessly and with the greatest precision.

From an ergonomic point of view, touchfree mixers such as Europlus E are also highly suitable for wash-basin installations.

Electronically actuated flushing systems are clearly recommendable. Where conventional flushing systems are to be installed, it makes sense to specify an actuation plate which is easy to hit and can be pushed with little effort. The Skate single flush actuation meets this requirement perfectly.

- intuitive operation
- scales always in sight
- light-action mechanisms
- Europlus E: Top ratings for hygiene and economy
- automatic run time settings can reduce consumption by up to 50%

Ergonomics & Economy

Planning a drinking water supply system

Standards and guidelines

The purpose of the Drinking Water Regulation is to protect human health from the detrimental effects of contaminated drinking water. This is achieved by warranting continuous drinkability and purity for human consumption at the point of use. Drinking water is a perishable food item without a use-by date printed on it. In addition to the high requirements made on all drinking water installations, the medical and healthcare sectors impose stringent standards of hygiene and operability for all mixers faucets and fittings.



Healthcare sector imposes elevated requirements on the quality of drinking water

The special importance of ensuring the highest possible quality of drinking water in the healthcare sector is also reflected in the prominent position of the German law on the prevention of infectious diseases which essentially determines the detailed requirements on the handling and use of drinking water. The implementation of the hygiene standards has been entrusted to the Robert Koch-Institut whose official recommendations (the so-called "Krankenhausrichtlinien" or "hospital guidelines") are also taken into account in the technical regulations. Given employees' exposure to water, the relevant Health and Safety standards play an important role in the legislative process

The German "Regulation on the Amendment of the Drinking Water Regulation of May 21, 2001" was published on May 28, 2001 as an implementation of the European Drinking Water Directive in German law. The Drinking Water Regulation (TrinkwV 2001) entered into force on January 1, 2003. The new regulation includes a number of important changes for drinking water supply systems:

- Extended range of application, so that its coverage now goes as far as the final tap
- Compliance with the regulation and thus the duty to maintain the quality of the drinking water in supply systems within a building are now the responsibility of the owner or operator of the system
- New and existing systems for the use of rain water and industrial water must now be reported to the German Department of Public Health
- More stringent requirements on the quality of drinking water
- Specific materials are required for certain types of water (see also DIN 50930 Part 6)
- Operator's notification duty towards the German Department of Public Health in case of exceeding maximum limits on chemical and microbiological contamination for instance upon the occurrence of legionellae or pseudomonadaceae.

- Increased monitoring of drinking water supply systems, particularly systems that provide water for the use of the general public
- Users of drinking water systems must be notified of water treatment activities such as the addition of disinfectants
- The responsibility for maintaining the quality of the drinking water in an installation within a building is now held by the operator.

Section 4 of the German Drinking Water Regulation works on the assumption that any drinking water that is going to be distributed complies with the microbiological and chemical parameters and indicators specified in the Regulation. It also assumes that the procurement, treatment and distribution of water comply with a range of generally established technical criteria. The installation within a house or institution is considered to constitute the final stage of the water distribution.

The standards and info sheets listed here are considered to be established technical criteria for the planning, setup and operation of drinking water supply systems. To update its technical criteria and to implement the relevant European standards, the Water Standards Committee for German DIN Standards has decided to revise and consolidate all standards in connection with drinking water supply systems. Moreover, a range of further important changes are likely to follow.

Health hazards in drinking water supply systems may be due to a variety of causes. Physical changes include, for instance, increased temperatures in the cold water range. Chemical changes are indicated by increased concentrations of metal ions, and stagnation is a sign of microbiological changes.

Some important issues in this context are proper professional planning in a way that suits a given special application, selection of the correct products and materials, impeccable craftsmanship in carrying out installations and use of a supply system for its intended purpose. Essential roles are played by servicing and maintenance, on the one hand, and by operation and use, on the other. The latter can ultimately only be ensured by the operator.

Planning a drinking water supply system

Standards and guidelines

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List of the most important regulations with relevance to the planning, construction and operation of drinking water supply systems in the healthcare sector

IfSG	Law on the Prevention and Combating of Infectious Human Diseases (Infektionsschutzgesetz - IfSG)	DIN 1988-1...8	Technical Criteria for Drinking Water Supply Systems (TRWI); Technical Criteria of the DVGW (Deutsche Vereinigung des Gas- und Wasserfaches -- German Technical Association for Gas and Water)
ArbStättV	Workplace Ordinance (Arbeitsstättenverordnung - ArbStättV)	VDI 6023 Sheet 1	Hygiene in drinking water supply systems - requirements on planning, execution, operation and maintenance
TrinkwV	Regulation on the Quality of Water for Human Consumption (German Drinking Water Regulation -- TrinkW 2001)	DVGW W 551 Info sheet	Drinking water heating systems and drinking water pipe systems, technical measures to reduce legionella growth; planning, installation, operation and renewal of drinking water supply systems
DIN EN 806-1...4	Technical Criteria for Drinking Water Supply Systems...; German version of EN 806-1...4	DVGW W 553 Info Sheet	Dimensions of circulation systems in central drinking water heating systems
DIN EN 1717	Protection of Drinking Water Against Contamination in Drinking Water Installations and General Requirements on Safety Precautions Against Backflow-related Contaminations of Drinking Water - Technical Criteria of the DVGW; German version of EN 1717:2000	RKI	Ordinance on Hospital Hygiene and Infection Prevention Recommendations on Hand Hygiene
		ZVSHK	German Sanitation, Heating and Air Conditioning Federation: procedure sheets and technical details for hydraulic pressure testing, start-up and hygiene

Basic requirements for hygiene-conscious planning

The detailed requirements arising from the technical criteria can be summarised in a small number of protection targets. Below, you will find notes on each of the protection targets with due regard to the requirements of the healthcare sector:

1. Requirements on materials and the selection of materials to prevent contamination from chemicals substances

Pipe systems, fixtures and faucets largely consist of metal. The inevitable contact of drinking water with inside metal surfaces leads to reactions governed by the laws of nature and may therefore cause an increase in the concentration of metal ions in drinking water. By minimising alloy components that would impact the drinking water and by adjusting materials to drinking water quality under either DIN 1988-7 or DIN 50930-6, GROHE ensures that its products meet these high standards.

2. Requirements on materials and on the selection of materials for the limitation of microbe colonies

Seen under hygienic aspects, non-metallic materials are particularly important in this context, as they may encourage the formation of biofilms in water supply systems. The requirements on such materials have been specified in the UBA Guideline on the Implementation of KTW (the German Testing Guideline for Organic Materials), supplemented by the requirements in DVGW info sheet no. W 270. According to the German industry standard DIN 1988-2, products may only be installed for drinking water purposes if they comply with the established technical criteria. This is not an issue for GROHE.

3. Dimensions of supply systems -- avoidance of excessively long periods of stagnancy and of germination

"Water must flow" -- even the Romans knew this. For modern water supply systems it means above all that pipes need to have suitable dimensions for their purpose, taking account of the conditions of simultaneousness (DIN 1988-3) which occur in the healthcare sector. It means that planners have a special responsibility when determining the simultaneousness factors



Planning a drinking water supply system

Standards and guidelines



of a given supply system. It is important to ensure that water renewal is as swift as possible through fast flow speeds, the connection of points of use and arranging regular points of use at the end of the supply system. VDI 6023 sheet 1 specifies that points of use must only be planned if they are regularly used for the purpose of maintaining drinking water quality. To ensure sound insulation, pipe systems must be kept separate from masonry and brickwork. On-the-wall installation systems from GROHE make it easier for planners to conduct their work

4. Securing connected machinery and appliances

If machinery is integrated into water supply systems (machinery such as heat exchangers, drinking water heaters, water treatment units) or if appliances are connected (such as washing machines, dishwashers and cleaning machines), then they must be secured primarily under DIN / EN 1717 and under the German standard DIN 1988-4, which is currently still valid. Depending on the hazard category of a given appliance, a safety device must be added. If the relevant machinery or appliance bears a DVGW certification label, then it is considered to be intrinsically safe and can be connected without the need for further measures.

5. Prevention of backflow

A drinking water supply system terminates at the exposed taps at the points of use or at the relevant safety taps as specified in DIN / EN 1717. In the case of bathroom fittings with hand or fixed shower attachments there is the danger of point-of-use backflow. Safety devices integrated into taps serve to protect the drinking water against such hazard, making GROHE taps intrinsically safe.

6. Anticorrosion requirements

Drinking water supply systems may suffer not only interior corrosion, but also contact corrosion, the formation of elements and exterior corrosion. DIN 1988-7 lays out the different types of corrosion and specified measures to ensure that planning and implementation meet anticorrosion requirements.

7. Prevention of leaks and of the intrusion of contaminants

Once completed, an installed pipe system must be given a pressure test under the ZVSHK procedure sheet. For hygienic and practical reasons, pressure testing should be conducted with either air or inert gas. If water is used for pressure testing, then the system must be started up immediately after the test, to ensure regular water renewal through flushing schedules. While laying pipes, it is important to ensure that no impurities can get into the system through any of the apertures.

8. Prevention of stagnant areas

Stagnant water in pipes has a detrimental effect on the quality of the drinking water and must be viewed in similar terms as exceeding the use-by date of a food item. The German industry standards DIN 1988-2 and DIN 1988-4 therefore specify that water must not remain stagnant during planning, construction or operation. Bypasses without any flow are not permitted.

9. Flushing and, where appropriate, disinfection of drinking water supply systems upon start-up

Drinking water supply systems must be thoroughly flushed upon start-up. The ZVSHK procedure sheet "Flushing, Disinfecting and Start-up of Drinking Water Supply Systems" specifies the different flushing methods (water or water/air, pulsatory) and when they are required. Flushing must always involve the use of filtered drinking water. To prevent the occurrence of pollutants, domestic systems that have been stagnant for a long time must be flushed thoroughly in coordination with the relevant water utility before the supply system is filled again.

10. Regular inspection of systems

Like all other technical systems, drinking water supply systems must be inspected at regular intervals under DIN 1988-8 and must be given appropriate maintenance. VDI 6023 sheet 1 provides a wide range of answers to questions on inspection and maintenance and contains a number of checklists.

Planning a drinking water supply system

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11. Disconnection of whole systems and parts of systems that are no longer in use

Pipes and systems that are no longer used for their intended purpose and which are therefore stagnating must be disconnected. Until this has happened, they continue to be part of the drinking water supply system and must therefore be flushed regularly.

12. Requirements on water treatment systems (filters, metering devices, ion exchangers) designed to prevent germination and to ensure observance of limits for chemical substances

All water treatment systems must meet the requirements of DIN 1988-2 and be correctly dimensioned. Any systems that differ from those specified above -- e.g. chlorine dioxide



Photo: Minimax GmbH & Co. KG, Bad Oldesloe

systems installed as precautions -- do not meet the purity requirements of the German Drinking Water Regulation. If substances are added to the drinking water, then users must be notified.

13. Requirements concerning inadmissible heating of cold drinking water

Under the German Drinking Water Regulation, cold water must have a temperature of no more than 25 °C. When planning and building cold water supply pipes, it is therefore important to ensure that there are no inadmissible increases in temperature. According to VDI 6023 sheet 1 any pipe systems with warm or hot water must be fed through different shafts and ducts. If water pipes for cold drinking water are situated next to warm or hot pipes in a given slot, then DIN 1988-2 stipulates that they must be given the same insulation as pipes in heated rooms.

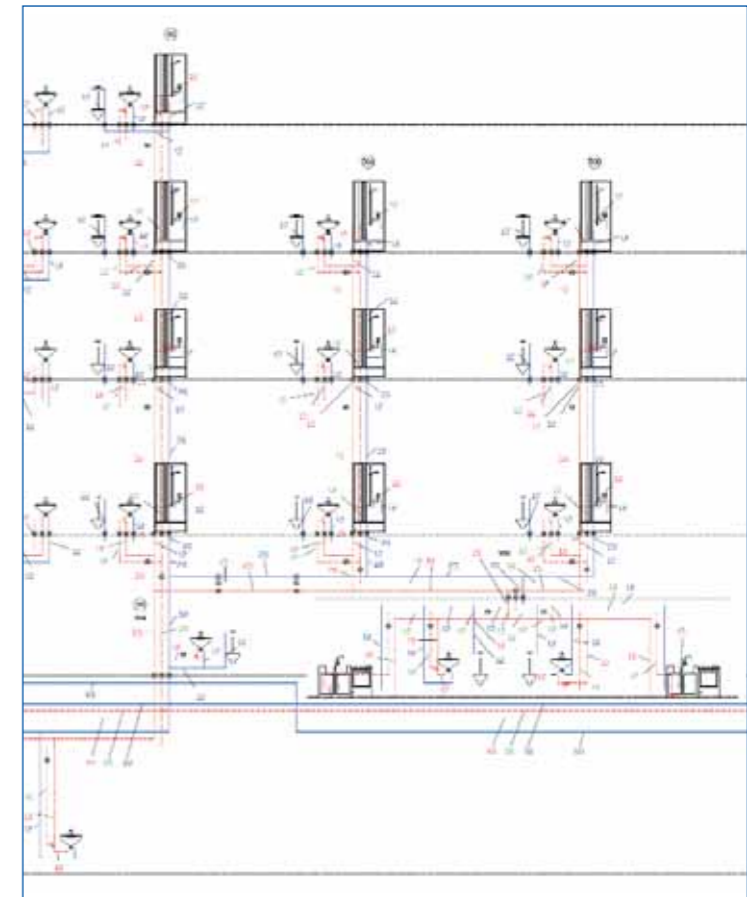
14. Prevention of wet fire extinction pipes as potential sources of contamination

If wet fire extinction systems are connected directly to the drinking water supply system, then this creates hygiene risks which cannot be controlled. Fire extinction and fire proofing systems are rarely used for their intended purpose. All planning, construction and operation must therefore ensure either that water does not turn stagnant or that it is kept away from the drinking water system with absolute certainty. Since the publication of the German industry standard DIN 14462 it has no longer been possible to connect type F wall hydrants directly to drinking water supply systems. Fire extinction and fire protection systems must either be connected indirectly or set up as dry/wet systems. Moreover, the new draft DIN 1988-60 contains even more stringent requirements on drinking water hygiene. The aim is to separate drinking water and fire extinction systems from each other through a multi-barrier system wherever this is possible.

15. Hot water temperatures above 60 °C to reduce legionella growth

DVGW info sheet no. W 551 describes measures for the prevention of legionella growth in drinking water heating and supply systems. The best way to warrant perfect drinking

water is to observe a storage temperature above 60 °C at all times and to ensure that the pipe network is calculated and hydraulically synchronised in accordance with DVGW info sheet no. W 553. Good circulation right up to the last tap on the top floor brings not only hygienic benefits but also user convenience. European DIN EN 806-2 standard expressly points out that mechanical mixers (i.e. mixers without thermostats) supplied with hot and cold water from different pipe systems represent a risk of scalding if one of the supply pipes fails or if there is a pressure drop in the cold water line. Consequently, installations for heated drinking water have to be planned with a view to minimising the risk of scalding. This is why water outlets in the healthcare sector have to be fitted with thermostat mixers permitting to set a maximum temperature limit. This upper limit is 43°C in hospitals and 38°C in special areas of care homes. GROHE thermostatic taps ensure that users do not scald themselves. DIN EN 806-2 also requires protection against hot surfaces. To rule out the risk of users hurting themselves when touching exposed parts of a drinking water installation, the surface temperatures of the latter should not exceed the temperature of the dispensed water, i.e. 38°C or 43°C respectively. The **GROHE CoolTouch®** technology ensures that GROHE thermostats meet this requirement. According to the DVGW Work Sheet W 551, installations for heating drinking water have to be planned in a way which permits to heat the contents of the storage tank to 75°C within a short time. This is required to perform thermal disinfection cycles at short notice. To ensure effective thermal disinfection, the water temperature needs to be at least 75°C at the outlet point for three minutes. A particularly easy unlocking mechanism on the Grohtherm 2000 Special makes it easy to perform thermal disinfections in next to no time.



Further information

A complete list of acts, standards, guidelines and procedure sheets can be found on the internet at www.mygrohe.de. The site also contains a comprehensive collection of links on issues of drinking water hygiene and on health assessments of drinking water contamination.

www.grohe.com

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