Trafag.
Sustainable.

"We always make our decisions with future generations in mind."

Dear readers

The family business Trafag was founded in 1942 and is now run by the fourth generation. We have remained true to one principle over the years: we always make our decisions with future generations in mind. We take this responsibility at Trafag serious.

The principle sums up sustainability and is the core of the Brundtland Report of 1987 – the first concept for sustainable development.

This brochure is the start of our systematic sustainability management and transparent sustainability communication. It gives you an overview of our business model and our value chain and provides you with an insight into our sustainability activities at our headquarters in Bubikon in the Zurich Oberland.

How does Trafag define the three classic sustainability issues of environment, social and governance? What do we want to achieve with our innovative strength? How does our Board of Directors guarantee sustainable corporate development? And why does cooperation in our international and multicultural team work so well? Find out on the next pages!

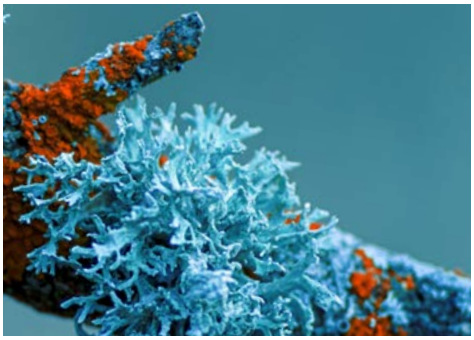
This brochure shows in black and white what we live by every day: creativity, problem-solving skills, further development. I am pleased that it continues in this spirit – with you, dear customers, dear employees and dear partners!

Yours

Dieter Zeisel
CEO Trafag AG

ESG requirements as an opportunity – Trafag on the way to more sustainability

The three classic sustainability topics are environment, social and governance, abbreviated ESG.



Company

With Trafag to more sustainability

Environment

More sustainability with high-tech

Social

More sustainability with attractive workplaces

Governance

More sustainability with responsible corporate governance

More sustainability with Trafag

We think in generations. That is why we have long-term customer relationships, develop sustainable solutions, rely on renewable resources and are considerate of our fellow human beings.

Sustainable action has been part of our corporate philosophy for over 80 years.

May we introduce ourselves?

Trafag AG was founded in Switzerland in 1942 and is a leading international supplier of high-quality sensors and devices for monitoring pressure, temperature, gas density and other physical quantities for industry. We hold a leading position worldwide in the development, manufacture and distribution of insulating gas density monitoring devices for the high and medium voltage industry.

What drives us
Our declared goal is to enable our customers to produce and operate their machines and systems safely and sustainably. On the one hand, we develop, produce and sell first-class sensors that can be relied on even under harsh conditions. On the other hand, we are quick to support our customers with excellent service and innovative solutions. We take on specific challenges and develop not only a wide range of standardised and configurable products, but also customised solutions for original equipment manufacturers (OEMs).

Where our products are used
Our products can be divided into the families of pressure transmitters, pressure switches, gas density monitors, pressure sensors (i.e. pure sensor elements) and thermostats. Hydrogen applications, shipbuilding, hydraulics, rail vehicles, large engines, potentially explosive areas, water treatment systems and test benches are just some of the areas of application for our solutions for pressure and temperature monitoring. Our gas density sensors and monitors are the first choice for reliable and safe insulating gas monitoring in gas-insulated high and medium voltage switchgear.

Why we can do it
Quite simply, we have the necessary technological core competences. We can develop and produce sensor cells and a microchip (ASIC) precisely customised to our cells and have mastered quartz tuning fork technology for measuring gas density. The result: we react quickly and flexibly to market requirements and develop reliable sensor solutions – so that our customers can continue to produce and operate safe products for sustainable applications in the future.

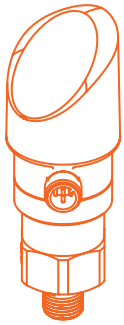
What sets our products apart
Our devices are characterised by high functionality, precision and durability and represent Swiss premium quality. That is why they are used worldwide. Certifications in all important and necessary areas are a matter of course for us.

Get to know us better in this video.

Our products and their areas of application

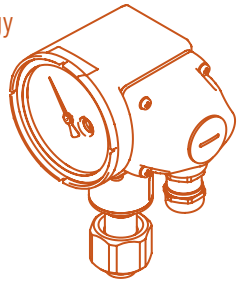
Pressure transmitter

Rail vehicles
Large engines
Shipbuilding
Hydraulics
Test benches
Hydrogen applications



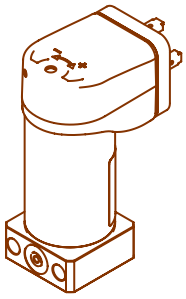
Gas density monitoring devices

High voltage technology



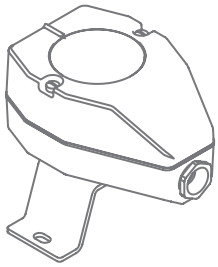
Pressure switch

Rail vehicles
Large engines
Shipbuilding
Hydraulics



Temperature monitoring devices

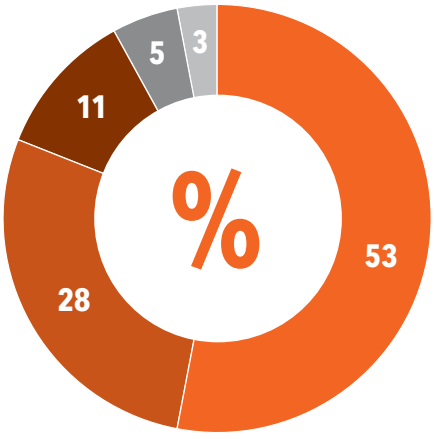
Large engines
Shipbuilding



Sensor cells

OEM applications
Measurement technology

Our products by sales



Pressure transmitter
Gas density monitoring devices
Pressure switch
Temperature monitoring devices
Sensor cells

Our corporate structure

The Trafag headquarters in Bubikon (ZH), Switzerland, is home to the main research and development site, the production site for electronic and some electromechanical devices and the Swiss branch. Further development and production sites are located in Germany and – for the Indian market – in India. There is also a production site in the Czech Republic. Electromechanical devices for the international market are manufactured here.

Our sales network includes 12 subsidiaries and 55 representatives who serve our customers around the globe with individually configured products.

This international orientation and cooperation guarantees the development, production and distribution of reliable Trafag sensors.

Our locations

Switzerland ● ● ● ● ●
Trafag AG headquarters

Subsidiaries:

Germany ●
Trafag GmbH

Germany ● ● ● ●
GFS Germany

Germany ● ● ● ●
Magnetic Sense

France ●
Trafag S.à rl.

Great Britain ●
Trafag UK Ltd.

India ● ● ●
Trafag Controls India Co. Ltd.

Italy ●
Trafag Italia S.R.L.

Japan ●
Trafag Japan Co. Ltd.

Austria ●
Trafag GmbH

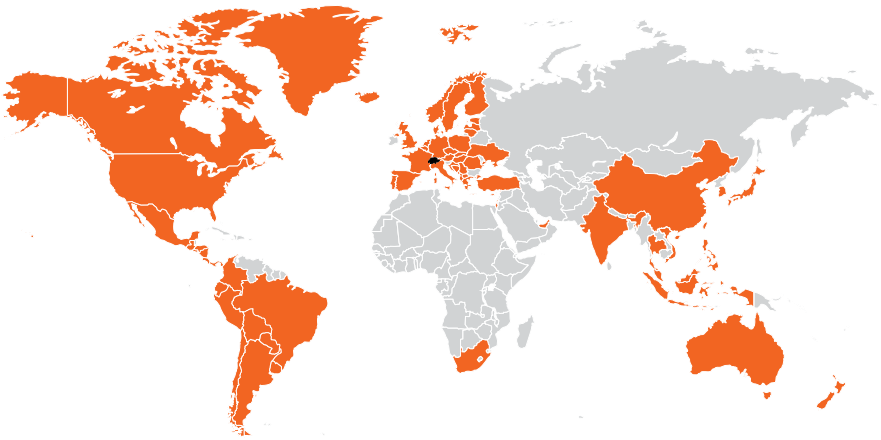
Poland ●
Poltraf Sp.zoo, Joint Venture

Spain ●
Trafag España S.L.

Czech Republic ● ● ●
Trafag spol.s.r.o.

USA ●
Trafag Inc.

● Headquarters ● Sales network (subsidiaries and representatives) ● Research and Development
● Production products ● Production of components



Internationally represented: Numerous subsidiaries and representatives ensure that customers receive the best possible advice locally.

Our organisation

We are clearly organised and yet work in flat hierarchies. For us, this is not a contradiction, but rather a sign of a modern, agile company.

This is the Trafag management:
- Dieter Zeisel (CEO)
- Armin Güntensperger (Head of Strategic Purchasing)
- Gunther Lustig (Head of IT Services)
- Dragan Radanovic (Head of Production)
- Marc Stämpfli (Head of Research and Development)

The management is supported by the management team:
- Nadja Brandenberger (Head of HR)
- Andreas Koch (Head of Marketing)
- Andreas Stoller (CFO)
- Florian Wächter (Head of Quality Assurance)

This is the Trafag Board of Directors:
- Robert Pfrunder (Chairman of the Board)
- Andreas Pfrunder (Board member)
- Balz Roth (Board member)
- Oscar Schwark (Board member)

Our way of working

Trafag's primary goal is to help shape people's lives safely and reliably today and in the future with innovative sensor technology. This goal can only be achieved by working together. Various guidelines support us in this endeavour:

Trafag Code of Conduct
Trafag employees are open and fair in their dealings with each other as well as with customers and partners. The binding Trafag Code of Conduct serves as a guide. It contains guidelines on the responsibility we have as an employer in the sensor business towards the environment, the economy and society.

Trafag Management Manual
The management manual is available to all employees and provides information about the company processes and how to handle the document structure.

Trafag guidelines
Our leadership principles "empowerment, focus, commitment, clarity and best performance" are anchored in our guidelines.

Personalities of integrity
The management positions at Trafag are filled by individuals with integrity, strategic thinking, strong leadership qualities and team spirit.

Communication
Communication between management and employees is open, respectful and transparent. All employees should be able to contribute.

Certifications
Our certifications reflect our broad process landscape: ISO 9001:2015 quality management system and ISO 14001:2015 environmental management system. The EcoVadis platform helps us to manage ESG risks and compliance and achieve sustainability goals.

Find out more about the Trafag success story.

Using high-tech to increase sustainability – for employees and customers

Our sensors help to ensure that machines and systems work energy-efficiently and that industrial applications are safe and reliable. We also produce and distribute our products in a way that conserves resources.

This is how we are committed to working in partnership for sustainable development. For over 80 years.

A close look at our environmental footprint

We are determined to reduce our ecological footprint. The Greenhouse Gas Protocol (GHG Protocol), an internationally recognised standard for recording greenhouse gas emissions, helps us to do this. It forms the basis for our climate protection plan, as it shows how many greenhouse gases are caused in which areas and where we should set our targets.

The various greenhouse gas emissions generated by our activities or in the value chain are divided into three scopes. These are also known as scopes and originate from the GHG Protocol.

In this first sustainability brochure, we have focussed on our headquarters in Bubikon and defined corresponding measures and targets.

We continuously review our target achievement on the basis of the EcoVadis platform.

Direct emissions (Scope 1)

Direct greenhouse gas emissions refer to emissions from sources owned or controlled by Trafag.

At Trafag, this has so far been 18 kilograms of sulphur hexafluoride (SF_6) per year, which were required for the oscillation test of the gas density sensors. This corresponds to 426 tons of CO_2. In 2024, however, we have succeeded in equipping all SF_6 production workplaces with a recovery system or completely eliminating SF_6 at these workplaces. We have also offset the CO_2 emissions from our fleet. We are proud that we are already climate-neutral in this area.

Energy efficiency (Scope 2)

Indirect greenhouse gas emissions from energy purchases refer to the emissions generated by the energy (electricity) purchased from the supplier.

When constructing our building in 2012, we made a conscious decision in favour of energy-efficient and sustainable construction methods and energy-efficient and sustainable operation: it was built to the Minergie standard, which aims for energy efficiency, comfort and sustainability.

In collaboration with the Energy Agency for Industry (EnAW), we are also committed to a ten-year programme for continuous and

The main Trafag building in Bubikon is easily accessible by public transport. There is a photovoltaic system on the roof, which helps to reduce external electricity consumption.

comprehensive sustainability. The EnAW advises us on how we can increase our energy efficiency and further reduce CO_2 emissions.

With this voluntary cooperation, we want to promote the sustainability of our business activities. We are developing solutions that make ecological and economic sense and can be implemented in practice: we have analysed our energy flows, identified potential savings and already implemented a number of measures that will reduce our CO_2 emissions - also in the long term.

Further energy-saving measures are being planned. We are also actively looking for additional ways to improve our energy efficiency.

Conservation of resources (Scope 3)

Due to other links with third parties, further indirect greenhouse gas emissions may be generated in both upstream and downstream areas of our activities. In fact, this is where the majority of emissions are generated.

With product innovations, we make a significant contribution to reducing emissions and conserving resources. All gas density monitors are designed for operation with alternative insulating gases, and the new 8719 gas density monitor has a completely SF_6-free reference chamber. Our customers therefore have access to products that are significantly more environmentally friendly than conventional ones.

In addition, our products are extremely durable thanks to robust materials and high-quality workmanship, which clearly helps to conserve resources and reduce the environmental impact throughout the entire product life cycle.

Our commitment to a sustainable value chain is also reflected in the fact that we have focused on reducing operational waste to less than 11 tonnes and the amount of paper, wood and cardboard consumed to less than 19 tonnes by 2024.

Certificates and labels

In addition to our ISO 14001 certification, the Minergie label for our building, our participation in the EnAW programme and the EcoVadis Committed medal, which we received in 2024, are proof of our commitment. In the long term, Trafag is aiming for a top EcoVadis rating. But actions are more important to us than words: Trafag is already CO_2-neutral in Scopes 1 and 2.

In a nutshell

The GHG Protocol (Greenhouse Gas Protocol) is a global standard for the accounting of greenhouse gas emissions. It divides emissions into three categories, known as scopes:

Scope 1 includes direct emissions from own or controlled sources, such as the combustion of fossil fuels in company vehicles or heating systems.

Scope 2 includes indirect emissions from the consumption of energy, e.g. electricity, heat or steam, which a company purchases from external suppliers.

Scope 3 covers all other indirect emissions along the value chain, e.g. those generated by suppliers, business travel, waste management or the use of products sold.

The system enables companies to comprehensively analyse their carbon footprint and develop measures to reduce their CO_2 emissions along the entire value chain.

Further information can be found at: ghgprotocol.org

Our building – sustainably built and operated

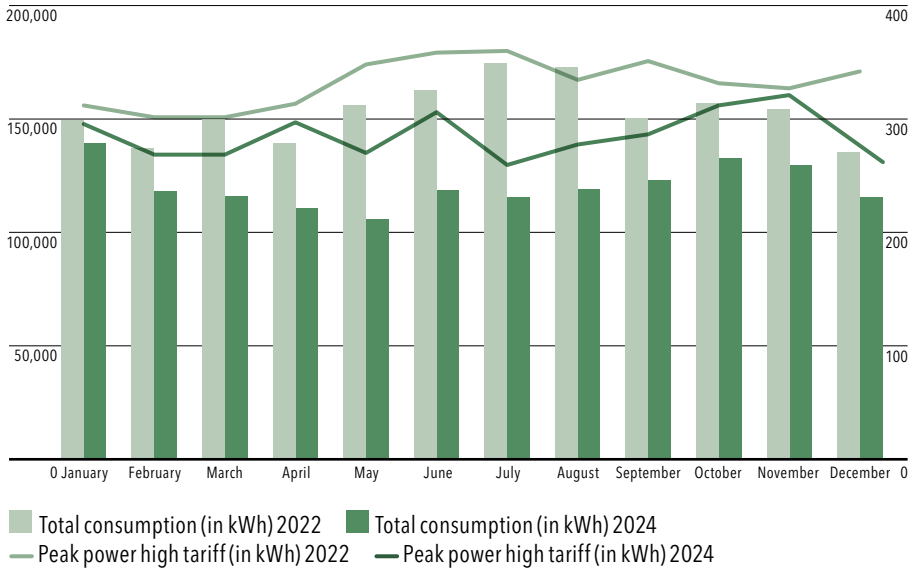
Since 2012, Trafag has had its headquarters in its own building in Bubikon. Before the construction there was an intensive planning phase to make the building as energy efficient as possible and to use as few land resources as possible. The result is a stately building surrounded by greenery. Thanks to clever construction and further investments, the operation of the company headquarters is CO_2-free.

The Trafag building in Bubikon is a showcase for environmentally conscious construction and sustainable land utilisation. It is surrounded by natural meadows and has an inner courtyard with native plants and ponds where amphibians also feel at home. The roof is partially extensively greened and offers additional green spaces.

Sustainably built and operated
Awarded the Minergie label by the Canton of Zurich, the building stands for CO_2-free operation. An efficient heat pump and a comfort ventilation system with heat exchanger ensure optimum air conditioning with minimal energy consumption. In addition, the high-quality building envelope and strong insulation contribute to the high energy efficiency.

Since 2023, a photovoltaic system has complemented our energy concept and enables us to produce our own electricity. The well thought-out building concept symbolises our commitment to the environment and our promotion of biodiversity.

Electricity consumption Trafag AG



Comparison of electricity consumption at the head office in Bubikon in 2022 (light green) and 2024 (dark green): External electricity consumption was reduced thanks to internally generated electricity and accompanying measures. The lines represent the electricity peaks. (Status: December 2024)

Saving energy – also in the future
In our ten-year programme with the Energy Agency for Industry (EnAW), we have already implemented numerous measures to reduce energy consumption. The optimisation of lighting and heating, the permanent tightness control of compressed air or the adapted ventilation during peak working hours – to name just a few examples – have led to considerable energy savings: Overall, we now require around 180,000 kilowatt hours less per year. This corresponds to around 8% of total energy consumption. And our goal is, of course, to become even more energy efficient.

Reduction in external electricity procurement
Another significant step towards reducing CO_2 emissions was taken in summer 2023 with the commissioning of the 290 kWp photovoltaic system. Since then, we have been producing around 240,000 kWh of electricity per year ourselves and have thus been able to reduce the amount of electricity we purchase. The remaining electricity requirement is also covered exclusively by hydropower.

The Trafag headquarters in Bubikon not only fulfils the Minergie requirements for sustainable construction and operation. When designing the surroundings, care was also taken to ensure that only native plants were planted.

Energy Agency for Industry

Trafag has been a participant in the Energy Agency for Industry since 2022 and is committed to economic climate protection.

ENERGIE-AGENTUR DER WIRTSCHAFT EnAW

Minergie

Minergie is the Swiss building standard for comfort, efficiency and climate protection. The high-quality building envelope and controlled air exchange play a special role here.

MINERGIE®

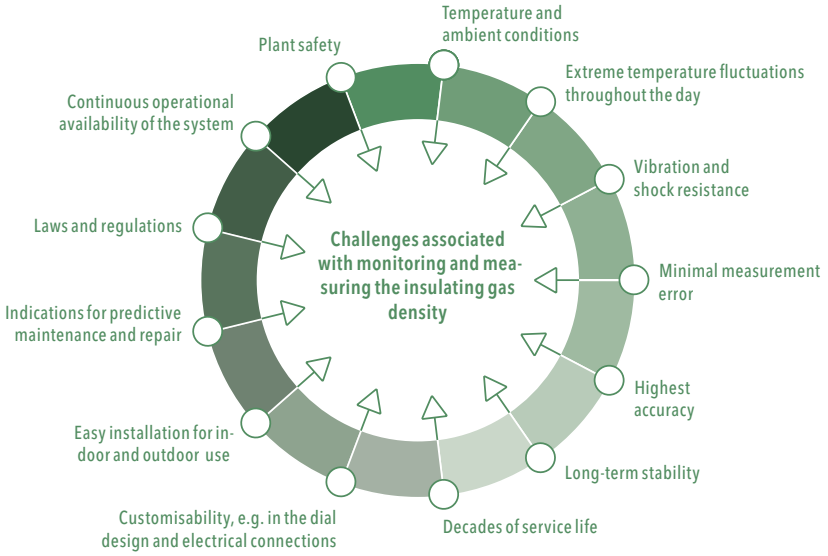
Power supply – safe and environmentally friendly

We switch on the light, charge the smartphone and have a coffee. It goes without saying, right? Electricity has become an integral part of our everyday lives and demand is constantly increasing. Not only at home, but also in the industrial sector. But what expertise is needed to ensure that the power supply is safe, reliable and environmentally friendly?

Electricity is the backbone of our modern life – from lighting and communication to mobility and industry. Our high quality of life would be unthinkable without a reliable power supply. With global efforts to decarbonise, the demand for electricity is constantly increasing as more and more areas of everyday life are being converted to electric operation. In addition, the operation of electricity grids is becoming more complex due to the feed-in of alternative energy sources such as wind and solar.

What is needed for a secure supply?
Power transmission and distribution grids are necessary for a secure energy supply, and high-voltage switchgear is an important component of these. A little technical jargon: High-voltage systems switch high voltages of 66 kilovolts up to 1,000 kilovolts, i.e. up to 4,000 times more than the mains voltage at the socket. In order to be able to switch such high voltages safely, gas-insulated switchgear is used in which the high-voltage components are installed in pressurised chambers. These contain highly compressed insulating gas – today still mostly SF_6 – which prevents or extinguishes arcing faults and short circuits.

Challenges in monitoring the insulating gas density



Environmental influences, operational safety, efficient maintenance, regulations:
These are just some of the challenges that operators of high-voltage switchgear have to overcome.

We take the supply of electricity for granted. However, many technical details need to be resolved before the electricity comes out of the socket – also for the sake of the environment.

Alternatives to sulphur hexafluoride (SF_6)

Sulphur hexafluoride is required as an insulating gas for the safe operation of high-voltage switchgear in electricity transmission and distribution. However, it is also a powerful greenhouse gas with a global warming potential of 22,800, making it 22,800 times more harmful than CO_2. The industry is working hard to replace SF_6 with more environmentally friendly alternatives that are just as safe and effective as insulating gases. Trafag is supporting these efforts with its many years of experience and broad technical expertise, as well as by developing a comprehensive product portfolio for the reliable monitoring of alternative insulating gases.

This article provides an overview of gas density monitoring with alternative insulating gases.

A gas-insulated switchgear – in contrast to an air-insulated switchgear – is a completely gas-tight encapsulated switchgear for high and medium voltage. The electrical conductors are protected by an insulating gas with a specific density. These compact switchgears can be realised in the smallest of spaces. This means that fewer land resources are required.

Find out more about high voltage transmission with the Trafag density monitors.

"Thanks to the good cooperation between industrial partners and Trafag, the products for the high-voltage industry are constantly being improved – also in terms of sustainability."

Gas density monitoring – the be-all and end-all

Gas-insulated high-voltage systems do not work just like that. A precisely defined density of insulating gas in the pressurised spaces is required for safe and faultless operation. A leak would be disastrous: it would not only jeopardise the functionality and safety of the switchgear, but would also violate environmental regulations. This is why permanent monitoring of the pressurised chamber is mandatory. Trafag developed gas density monitoring devices back in the 1980s – in co-operation with well-known switchgear manufacturers. The technological centrepiece of the devices is the patented reference chamber system. It is still unrivalled in terms of accuracy and reliability and is used in switchgear all over the world.

Finding clever alternatives

The physical properties of SF_6, the insulating gas commonly used today, make it very suitable for use in gas-insulated switchgear. However, it is also a powerful greenhouse gas with a global warming potential of 22,800, which is why its use is being increasingly restricted and more environmentally friendly alternative insulating gases are being used.

However, alternative gases have a lower density than SF_6 and also have a lower insulating capacity at the same pressure. The pressure chambers of the gas-insulated switchgear must therefore be filled with significantly higher pressure in order to achieve the same insulating properties. Trafag has realised the necessary adaptations in close cooperation with industrial partners: The electromechanical gas density monitors, the electronic density sensors and the hybrid gas density monitors have been further developed so that leakage monitoring is – and remains – safe and reliable even with alternative insulating gases. This proves that technical expertise and innovation can not only make the power supply safer, but also more environmentally friendly. Also in the future.

SF_6-free reference chamber

Cross-section of the reference chamber of a new generation gas density monitor. The reference chamber principle compares the defined insulating gas density in the reference chamber with that of the system gas.

Find out more about gas density monitoring in SF_6-free switchgear.

The reference chamber principle, which Trafag introduced to the market over 35 years ago, offers unrivalled reliability and safety – even in the event of strong vibrations during the switching process. A small amount of the system gas is hermetically sealed in the reference chamber. This quantity corresponds to the minimum density that must be present in the system. Temperature-related pressure changes in the system also affect the reference chamber in the same way, resulting in inherent temperature compensation. In conventional gas density monitors, just under one gram of SF_6 is filled into the reference chamber in systems with SF_6. This is no longer the case with the new generation of SF_6-free gas density monitors.

The newly developed reference chambers are no longer filled with the same insulating gas as the switchgear, but with a mixture of nitrogen and CO_2 that reflects the isochoric (constant volume) behaviour of the system gas. When calibrating the measuring system, the switching points and the scaling of the display are precisely matched to the values of the effective insulating gas in the system.

With regard to future alternative insulating gas mixtures, this has the advantage that the exact gas mixture no longer has to be provided, but that the reference chamber filling can be designed purely mathematically based on the physical data (isochore values) of the specific insulating gas mixture in the system and produced on this basis.

For systems using the insulating gas SF_6, the new generation of SF_6-free measuring systems also offers advantages, particularly when it comes to disposal at the end of their service life: despite the very small amount of less than one gram of SF_6 per gas density monitor, conventional gas density monitors with SF_6-filled reference chambers must be disposed of in a special way depending on national legislation. And the disposal regulations for SF_6 are constantly being adapted.

The new 87x9 generation reference chamber measuring system is filled with a gas that can be safely disposed of without further measures, regardless of the insulating gas in the system. The disposal of gas density monitors containing SF_6 should already be considered for SF_6 systems that are to be converted to alternative insulating gases in the medium term.

This video shows the advantages of the new gas density monitor, which also works with alternative insulating gases.

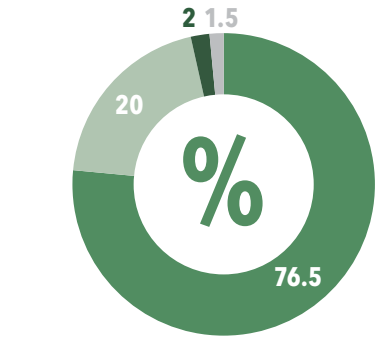
Lower emissions in shipping thanks to future fuels

Shipping plays a crucial role in the global economy, as it accounts for 90% of global trade. The challenge is that it also causes 3% of all greenhouse gas emissions. The International Maritime Organization (IMO) has adopted a strategy to reduce emissions. Alternative fuels play a major role in this.

In order to reduce the impact of shipping on the environment, the IMO has adopted a strategy to reduce greenhouse gas emissions. On the one hand, ship design is to be optimised so that less fuel is consumed. On the other hand, the main focus is on the fuel itself: In view of increasing environmental regulations and a growing social awareness of sustainability, traditional fossil fuels are no longer fit for purpose.

Alternative fuels in shipping

The most commonly used future fuels at present:



(Source: futurefuels.imo.org)

Future fuels – alternative, low-emission or even emission-free fuels – offer innovative solutions to drastically reduce CO_2 emissionsin shipping. However, they also present challenges. For example, an appropriate infrastructure for refuelling ships must be available on land. And production must also be economical and sustainable. In addition, the fuel must not only be environmentally friendly and cost-effective, but must also be able to be stored safely on board and in sufficient quantities for long journeys. Engines have already been developed that can run on alternative fuels.

Suitable alternative fuels for large cargo ships

For large cargo ships, which in the past were primarily fuelled with heavy fuel oil (HFO), three alternative fuels are primarily available: Liquefied natural gas (LNG), methanol and ammonia. Hydrogen, on the other hand, is currently considered unsuitable for large ships or longer distances because it has a low energy density and hydrogen tanks would therefore take up too much space on the ship.

LNG, on the other hand, is already being used on a large scale today, particularly in dual-fuel engines. These can be operated with both LNG and liquid fuels such as HFO or marine diesel.

Methanol as a fuel offers emission advantages, is already readily available and is relatively similar to today's fuels, especially in terms of handling and combustion, which reduces development times and risks.

In the longer term, ammonia (NH_3) is an interesting alternative because, unlike carbon-based methanol, it does not produce CO_2 during direct combustion. It can also be produced in large quantities from environmentally friendly hydrogen using conventional processes. Ammonia also has a much higher energy density than hydrogen and can therefore be stored and transported more economically. However, it is very toxic and has combustion properties that pose particular challenges in the development and operation of engines and ships.

As large cargo ships are built for a service life of 20 to 40 years and it is not yet clear which fuels will prevail in the long term, today's ship engines are often designed for several fuels. In addition, some of the existing fleet will be converted over the next few years so that older engines can also be operated with future fuels.

What significance does this have for pressure measurement?

Due to the different chemical and physical properties of the new fuels, the pressure measurement on the engines and units must also be adapted. While existing technologies and products can still largely be used for LNG and methanol, new pressure transmitters must be developed and integrated in some cases for engines fuelled with ammonia.

The measuring cell of the pressure transmitter is made of stainless steel and is completely welded. It is not damaged by ammonia. However, the elastomers currently used as sealing materials are not suitable for contact with ammonia. In order to avoid any leaks, the sealing geometry must therefore be adapted or sealed double chambers must be used.

In addition, the risk of explosion is greater with ammonia than with HFO. Therefore, appropriately certified pressure transmitters must be used more frequently with ammonia-powered engines. Trafag works closely with renowned marine engine manufacturers to develop customised pressure transmitters that are safe, reliable, accurate and cost-effective. Trafag's many years of experience in sensor development, its expertise in important core technologies and flexible manufacturing enable it to quickly develop solutions with a high degree of maturity and thus shorten the development time for new engines. In this way, Trafag is making an important contribution to the transition to more environmentally friendly fuels in shipping.

The International Maritime Organization (IMO) is calling on the shipping industry to reduce its greenhouse gas emissions by 50% by 2050 compared to 2008 levels. Trafag's customers, who develop and manufacture marine engines, are making a significant contribution to this.

Hydrogen – miracle weapon against climate change

Hydrogen has the potential to replace fossil fuels such as gas, coal and oil. It is therefore often seen as a beacon of hope for a sustainable future. In fact, hydrogen can power vehicles, store green electricity, make industry climate-friendly and make a decisive contribution to reducing greenhouse gas emissions. However, pressure measurement technologies play a key role here.

What does it actually take for hydrogen to realise its full potential as an energy carrier? Quite simply: sophisticated technical solutions! Small, precise pressure sensors that can measure the pressure in hydrogen systems stably and accurately are particularly important. This is the only way to operate the systems safely and efficiently.

The good news is that innovative technical developments will make it possible to establish hydrogen as an environmentally friendly energy source on a large scale in the long term. However, there is no way around the technical challenges of the hydrogen economy.

The hydrogen industry depends on reliable pressure measurement

Hydrogen mobility, i.e. the operation of cars, buses and lorries through to rail vehicles and aircraft, requires a very high pressure in the tanks. This is the only way to store sufficient energy to cover similarly long distances without refuelling as with fossil fuels. Vehicle tanks are therefore usually refuelled at a pressure of 350 or even 700 bar. The requirements for valve technology, tanks and compressors in the petrol stations and, of course, for the pressure measurement integrated everywhere are correspondingly high.

Our desire for mobility today is often at odds with what is good for the environment. To fulfil this desire sustainably in the future, we need innovative technologies - and clever detailed solutions.

While hydrogen has been used in the chemical and process industries for many years at low pressure and monitored in terms of pressure, special challenges arise when hydrogen is used as an energy source and in mobility: Pressure measuring ranges of up to 1,000 bar, often limited space and at the same time high cost pressure for large series require innovative sensor concepts.

Challenges in the pressure measurement of hydrogen

The hydrogen molecule is a technical tricky nut to crack. As the smallest molecule of all, it can penetrate the structure of many commercially available steels and other materials by diffusion. The consequences: It either becomes permanently embedded in the structure or penetrates it (permeation). A combination of both effects is also frequently encountered. Hydrogen embrittlement is also very well known. This occurs when penetrated hydrogen changes the structure of the steel. In the case of hydrogen permeation, sorption (absorption) on the membrane surface is followed by diffusion through the membrane material and desorption on the reverse side. This process is not a problem in most applications due to the sufficiently large wall thicknesses (for example in pressurised tanks). However, in pressure sensors with their inherently thin walls, the permeation of hydrogen through the measuring diaphragm can lead

to a reaction with the sensor elements. This can permanently damage the sensor, resulting in incorrect measured values.

The innovative solution is in Trafag products

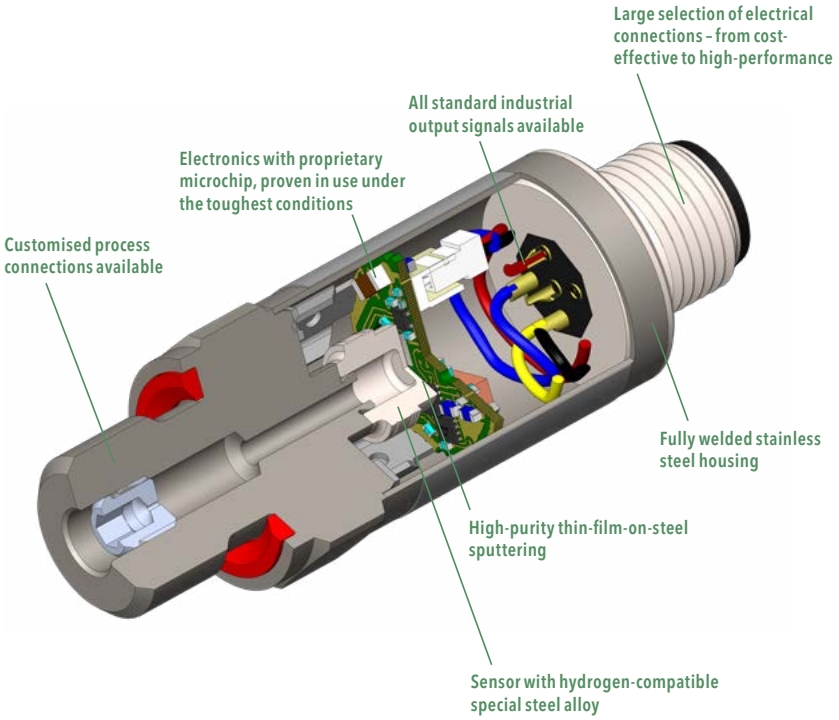
Pressure sensors are usually made of steel alloys, which are very susceptible to reactions with hydrogen. For this reason, attempts are sometimes made to prevent the penetration of hydrogen with a gold coating. However, this gold coating is sometimes inadequate, namely when it is too thin or is damaged in places during operation. Trafag has developed an innovative solution here: a special steel alloy for pressure sensors that come into contact with hydrogen. This alloy of nitrogen-hardened, austenitic steel is not only compatible with hydrogen, but also has the material properties required for robust, accurate and long-term stable pressure sensors.

Trafag has combined the pressure measuring cell made of this special steel alloy with the design of mobile hydraulic pressure transmitters and the proven components tested under the toughest conditions to create a new product line of pressure transmitters: the NHT 8250 hydrogen pressure transmitters. At the same time, the measuring cell was integrated into a pressure transmitter established in shipbuilding, which is also approved for use in potentially explosive atmospheres (Ex zones).

These two product lines cover the requirements of a wide range of hydrogen applications: in energy generation in electrolysers, in valves for mobile and stationary tanks, in compressors and petrol stations, in fuel cells and even in combustion engines that can run on up to 100% hydrogen. Reliable pressure monitoring as the basis for the safe use of hydrogen as a sustainable energy source is therefore guaranteed.

Find out more about pressure measurement in the water industry.

Construction of a hydrogen pressure transmitter



The illustration shows the design and key features of the Trafag NHT 8250 pressure transmitter, which make it suitable for mobile and stationary hydrogen applications such as fuel cells, electrolysers, compressors and storage tanks.

How does a pressure transmitter actually work?

The two key elements of the pressure transmitter are the pressure sensor, which detects the pressure of the medium and converts it into an electrical signal, and the application-specific integrated microchip, which converts the generated electrical signal into a standardised output signal.

This video explains how a pressure transmitter works.

More sustainability with attractive workplaces

Progressive working conditions, comprehensive health protection programmes, effective guidelines for occupational safety and the corporate values of "teamwork and fairness" make Trafag a popular employer.

We meet at eye level. And we have been proud of this for more than 80 years.

This is how we work

40 hours

has a full-time week with us.

2 days

per week we can work from home.

5 weeks of holiday

are available to all employees. From the age of 50, there are three additional days' holiday per year. We have company holidays between Christmas and New Year, with 24 December being given as an additional day off.

10 additional day's holiday

can be claimed annually with a corresponding salary deduction.

Leisure Plus

means five more day's holiday with a 2.2% wage deduction. Our employees can choose this every year. We also offer a variety of other flexible working hours and part-time models.

50–100% cost coverage

for further training that is planned individually together with the employees.

Equal pay for equal work

for men and women is enshrined in Article 8 of the Federal Constitution. We have Landolt & Mächler review whether this is also the case for us every year – most recently in the 2024 salary comparison analysis.

Shift allowances

are paid to all employees in production. For the night shift, there are additional time credits such as time bonuses and paid breaks in addition to the financial bonuses.

This is us

215 employees

work in Bubikon, 50 of them in a part-time workload.

8–10% fluctuation

speak for the satisfaction of our employees.

7 apprentices

are trained.

44 years

is the average age of employees in Bubikon.

35 nations

are represented at the Bubikon headquarters.

33% women

work in Bubikon, 16% of them in management positions.

Motivated work is more fun

Only those who feel comfortable and appreciated at work can realise their full potential. We are convinced of this. That's why Trafag has created a modern working environment that ranges from flexible working hours to regular team events.

Flexibility at work
Flexible working - that's what many employees want these days. Trafag makes it possible: at the Trafag headquarters in Bubikon, both flexitime and annualised working hours apply. We also offer attractive part-time models. In addition, all employees can work from home for up to two days of their working time. These flexible models enable employees to adapt their work to their own personal rhythm and better reconcile family and career.

What is easy to realise for office workers is difficult for shift workers. Because they have no opportunity to organise their working hours flexibly, Trafag compensates them with attractive shift and night allowances.

Healthy work-life balance
The weekly working time for all full-time employees is 40 hours with five weeks' paid holiday per year. Depending on age, the holiday entitlement can be up to 28 days. Trafag employees also have the option of buying holiday days or taking additional holiday days by reducing their salary. The 24th of December is given to employees as a day off. A token of appreciation at the end of the year for their great commitment!

Generous training grants
Trafag is happy for its employees to continue their education and therefore contributes to the costs of external training for employees at the head office. Depending on the training, it covers 50% to 100% of the costs.

Team events bring people together
Trafag attaches great importance to a good working atmosphere and strong teams. Special team events are therefore an integral part of the annual programme at the head office. In addition, there is a major event every year for all head office employees. This is organised by a dedicated team and is one of the annual highlights for the employees.

Satisfied and valued employees
Committed employees make Trafag what it is. That is why they are regularly asked in interviews how satisfied they really are. The analyses show that Trafag employees feel valued and appreciate the modern Trafag working environment. An indicator that makes us proud. Because satisfied employees are motivated employees – and our customers also benefit from this.

Listen to what our employees have to say about their day-to-day work.

Just take a break now and then, here playing table football in the cafeteria.

Prevention proves its worth

Prevention is better than cure. If you do a lot every day, you have to take care of yourself. We are aware of this. That's why Trafag does everything it can to ensure that its employees are and remain healthy – both physically and mentally.

Ergonomics makes the difference

Ergonomics at the workplace play a major role in activities that remain the same every day. This is the only way to ensure that you stay healthy and enjoy your work. Trafag pays attention to this. In production, the workstations are ergonomically designed and equipped with special lighting. And the office workstations have height-adjustable desks and ergonomic office chairs.

A healthy indoor climate at the workplace is just as important. The entire Trafag building therefore has comfort ventilation and filters that remove dust and pollen from the air.

Moving as a key factor

If health complaints arise despite all efforts to ensure ergonomic workplace design, uncomplicated measures are implemented as required: For example, some time ago employees in production complained of neck tension. Together, they looked for ways to remedy the situation and improve their well-being. The result is movement videos that were produced together with the production employees. They can now exercise and move to the films several times a day. Trafag also encourages employees to exercise during breaks or in their free time.

You are what you eat

Exercise is one thing, nutrition is another. That's why at Trafag fresh and healthy meals are available every day. In the cafeteria, employees benefit from delicious and affordable menus. For those who bring something from home, there are microwave ovens to heat up the food. And true to the motto "An apple a day keeps the doctor away", our employees have access to large fresh water dispensers as well as crunchy apples.

Sport unites across departments, here at the football tournament in Bubikon.

Join us for a virtual tour through the Trafag headquarters.

Safety first

Trafag is not only concerned about the health of its employees, but also their safety. It has a corresponding concept in place, which continuously incorporates experience gained. Training and communication campaigns also ensure that employees are kept up to date with the latest safety information and are made aware of hazards and safe behaviour.

Strong together

Trafag recognises that life is not always a straight line. That's why our employees in difficult situations – whether professional or personal – can make use of the counselling services of SIZ Care AG free of charge. Confidentially, of course. If employees are absent despite all measures, Trafag utilises a tried and tested case management system. This accompanies those affected on their return to work.

Participation in sports subscription

Trafag offers its employees an annual contribution towards the cost of sports subscriptions in order to promote physical activity and health.

Active breaks

All employees have access to a table football and a table tennis table. A good way to relax your muscles and clear your head.

Fit in your free time too

Trafag has entered into a partnership with a fitness centre in the neighbouring municipality. This enables employees to benefit from attractive special conditions. Last but not least, a large number of employees are also active in sports in their private lives: a sizeable group uses their lunch break for sporting activities in the green surroundings. Trafag also provides financial support for sporting events such as football tournaments and running events.

Our cafeteria offers fresh and seasonal menus. You can also heat up your own food and eat it here – or in the garden in summer.

"Our collegial culture sets us apart"

The Trafag headquarters in rural Bubikon is an attractive place to work in a pleasant atmosphere. Few people work in such beautiful surroundings. The building is surrounded by fields and meadows, and the courtyard is also green.

Head of HR Nadja Brandenberger reveals in an interview what other aspects make Trafag an attractive employer.

Nadja, the Trafag team in Bubikon is international and multicultural. How does the collaboration work?

Nadja Brandenberger: Cooperation works very well for us. This is not only due to the qualifications of our employees, but also to the fact that we attach great importance to communication and teamwork skills when recruiting. This is having an effect: we maintain a respectful, open dialogue at eye level – regardless of whether a person works in production or development, what function they have, how old they are or where they come from. What unites us despite this diversity are our common goals and values. They give us a strong sense of togetherness. We provide transparent information about our planned goals and business figures at the quarterly employee briefing.

> "We maintain a respectful, open dialogue at eye level."

We also actively promote team spirit, e.g. through our large annual employee event or the Friday evening beer. Our building also contributes to this: With communal spaces such as the cafeteria and the inner courtyard, we deliberately create places where the focus is on socialising and working together.

What is important at Trafag in terms of cooperation between line managers and employees?

At our company, cooperation is based on a principle of shared responsibility: managers and employees work hand in hand to achieve our goals. Each individual makes their own contribution to success, and managers ensure that a supportive environment is created in which everyone feels valued and empowered. A constructive error and feedback culture is particularly important to us. Mistakes happen – this is not a problem for us, but an opportunity to develop further. The security of knowing that you can make mistakes and learn from them strengthens confidence and promotes growth.

What do employees value most about their employer?

During our annual employee appraisals, we always conduct a pulse survey to find out how satisfied our employees are. The results of these surveys and the ratings on the kununu platform clearly show that our employees particularly appreciate the collegial and informal culture. This is also in line with my personal impression: our open culture, which is practised across all levels, really sets us apart.

Trafag as an employer

We offer a wide range of job profiles - from those for experienced professionals to training positions such as apprenticeships, internships or traineeships.

Find out more about career opportunities at Trafag.

"The combination of high-tech and nature makes this workplace unique for me."

Nadja Brandenberger, Head of HR at Trafag in Bubikon

Here, anyone can knock on the CEO's door at any time – there is no fear of contact. But it's not just the culture that counts: Our employees are also proud to be part of an innovative company and find their work exciting and rewarding. The good work-life balance is also highly valued, thanks to the flexible working hours, home office options and additional offers such as holiday purchase.

"Managers create a supportive environment in which everyone feels valued and empowered."

Where is there still room for improvement?

As a rather small company with flat hierarchies, we naturally do not offer as many traditional career opportunities as large corporations. Management careers are therefore limited. But there are certainly opportunities for professional development. We are currently working on making our talent management and career planning even clearer and more structured. In this way, we want to create exciting long-term development prospects for our employees.

What do you personally value most about your job at Trafag?

For me, there are several things that make the job at Trafag special. Firstly, the HR department is very important here. We are not just the ones who draw up the employment contracts, we are real sparring partners for the CEO and the management. We can contribute ideas and play an active role in shaping the company. That's incredibly motivating! Secondly, the combination of high-tech and nature makes this workplace unique for me. I love getting up every morning because I know that I can make a positive difference together with my fantastic team.

Top Company

Trafag has once again received the "Top Company" seal from kununu, which recognises the best employers.

More sustainability with responsible corporate governance

We act responsibly and fairly, and we proactively look for the best solutions.

For over 80 years, we have been committed to innovation, reacting quickly to requirements that promote climate-friendly developments and looking to the future with foresight.

This is our contribution to promoting sustainability. For current and future generations.

"As a family business, it is in our nature to think long-term"

Trafag is committed to long-term corporate management based on clear values, guidelines and transparent risk management. This enables decisions to be made that are fair to both current and future generations.

In this interview, Chairman of the Board of Directors Robert Pfrunder provides insights into the company, explains the importance of governance and sustainability and reveals what Trafag's success factors are.

Robi, what is Trafag's vision?

Robert Pfrunder: Our vision is to offer our customers the most reliable sensor solutions.

What does reliability mean in concrete terms?

For us, reliability means that our sensors work without failures and have a long service life. This means that they not only guarantee process reliability, but are also sustainable.

And what is Trafag's mission?

Our mission is to focus on those market segments where we can offer our customers high added value. This helps us to use our resources in a focused and effective manner.

What values characterise Trafag?

Our values are "Teamwork and fairness", "Exceptional and best performance" and "Innovation and design". We are not a public or listed company. Accordingly, our values are not claims that we use to promote our image to the outside world, but are in fact our internal compass. For me personally, respectful, appreciative and fair interaction at eye level, which is part of "teamwork and fairness", is particularly important. You need leadership and someone who ultimately makes the decisions. But there is no need for unnecessary hierarchies.

> "The mission helps us to use our resources in a focussed and effective manner."

All employees should get involved and help shape the future of Trafag.

And how are these values put into practice by management and employees?

The company values are discussed and adapted to new circumstances in regular workshops with the management team. This enables us to reach a consensus and ensure that all managers identify with the values and actively exemplify them. The role model function of managers is the most important factor in getting all other employees on board. Incidentally, employees were also able to express their views on the values at a general meeting. Involving everyone pays off. In this way, the values are actively lived, which characterises and strengthens our corporate culture. I notice this very clearly, for example, when I eat lunch in the cafeteria and talk to the various employees. They reflect the values and live them. I also regularly receive feedback from customers who are impressed by the Trafag culture after visiting the company. They tell me that the joy and pride of Trafag employees is palpable. This is probably the best proof that our values are not just lip service, but are really lived. To be honest, that also makes me proud.

Let's talk about governance: What are Trafag's most important guidelines?

In addition to our values, our employee handbook provides important orientation. It is our compass, our guide. All our employees have access to the handbook, which is available online. This also applies to the entire process landscape and other documents. New employees receive appropriate training.

Robert Pfrunder, Chairman of the Board of Directors of Trafag, studied natural sciences at the University of Zurich and completed an MBA programme at INSEAD. After gaining initial experience in consulting, he joined Trafag in 1984 and was CEO and Delegate of the Board of Directors from 1990 to 2018. He is married, has two children and enjoys spending his free time in the mountains, on the water and in the air.

Robert Pfrunder, Chairman of the Board of Directors of Trafag

The Code of Conduct is also binding and contains directives on the environment, safety, health, fair competition and data protection, among other things. To ensure that our guidelines are also adhered to in our supply chain, we require our suppliers to comply with our purchasing conditions and the Code of Conduct for suppliers.

"Respectful, appreciative and fair interaction at eye level is particularly important to me."

How does Trafag's risk management work?

We work with two tools that are embedded in the internal control system: a risk matrix and a traffic light system. As part of the risk matrix, we prioritise risks based on a quantitative assessment of their probability and consequences. The traffic light system is based on key figures for various areas of the company. Using the traffic light system, the entire management team compares the risk management objectives with the current situation once a quarter and decides on measures. In order to raise awareness of potential risks among all employees, the current version of the risk matrix is always displayed on the intranet homepage.

How does the Trafag Board of Directors ensure sustainable company development?

We are not a listed company that is forced to think in quarters and deliver short-term results. As a family business, it is in our nature to think long-term and act with foresight. This means that we accept short-term losses in order to achieve our long-term vision. In this way, we ensure our continued existence for generations to come.

As Chairman of the Board of Directors, how do you assess the role and importance of the Trafag Board of Directors?

The task of the entire Board of Directors is to set the strategic direction of the company, i.e. to set the sails correctly. I see the Board of Directors as a sparring partner for the operational management. It should support and advise the management. However, it is also important to take a critical view, scrutinise proposals and decisions and express constructive criticism. At Trafag, the Board of Directors does not just stand on the sidelines, but is actively involved. This is another reason why we keep it small with four members. This enables the efficient involvement of all members of the Board of Directors with their different skills and experience. Because here too, as in the entire workforce, each and every individual is important to ensure that we stay on course.

We act in accordance with applicable guidelines and specifications – and with foresight

For us, compliance is not just a must, but a question of our responsibility, as a company. It ensures that everything that happens in the company is legally compliant, ethically correct and sustainable. This protects and strengthens us in the long term. We also act with foresight. This means we are prepared for new regulatory changes in good time.

How we ensure fair competitive behaviour

Trafag strictly adheres to the rules of the game that apply in the Swiss and international business centres: standards and laws according to the Swiss Code of Obligations, ISO standards, regulations of the Federal Coordination Commission for Occupational Safety and the Antitrust Law as well as competition regulations. The Board of Directors reviews our risk management and internal control system every year. We also ensure that strategic information does not leave the company. Finally, our trading partners are free to set their own resale prices or other sales conditions.

The goals we pursue in the area of governance and compliance

We have clear organisational, competence and signature regulations: we apply the dual control principle to all important decisions. Everyone who works at Trafag is trained in corporate values and risks. In addition, our annual financial statements are audited by an external auditor. Our accounts are prepared in accordance with International Financial Reporting Standards (IFRS). Furthermore, we do not supply any products to sanctioned countries.

How we deal with data protection and what measures we take

Here, too, there are clear requirements in the form of the Data Protection Act. Our financial reporting is prepared in accordance with the legal requirements of Swiss law. To comply with these requirements, we have appointed an internal data protection officer.

We comply with all applicable standards, laws and guidelines. This applies both internally and externally. In addition, we take a forward-looking approach to potential changes in regulations so that we are prepared for them in good time.

We take responsibility

The Code of Conduct is an important guideline for us. We use it to ensure that we meet sustainable standards as a company and as an employer and fulfil our responsibility towards the environment, our employees, our customers and society.

We want to communicate and act transparently, fairly and sustainably. That is why we have voluntarily decided to define a Code of conduct and comply with the corresponding rules.

The main purpose of the work guidelines is to protect employees and ensure that they can work healthily and safely. There are also clear rules for dealing with customers, business partners and authorities. They are designed to ensure that all applicable laws and legal regulations are complied with. As a company, we also bear responsibility for our employees, society and the environment. To this end, we have social, moral and ethical standards that we consistently adhere to.

Creating corporate value responsibly
- Responsible and successful long-term corporate management
- Innovative, sustainable and competitive precision products
- Customer-orientated, efficient and environmentally friendly processes
- Adherence to laws (compliance) and guidelines and standards (conformance)

Acting responsibly as an employer – attracting, developing and retaining the best employees
- Qualified and motivated employees as a decisive competitive factor
- Progressive, fair and safe working conditions
- Career and further development opportunities
- Equality, diversity and integration in a multicultural and multinational environment

Taking responsibility for the environment and the international community
- Long-term ecological sustainability of business activities
- Continuous improvement of products, processes and infrastructure in terms of resource consumption and emissions
- Efficient and sustainable use of resources

Making an entrepreneurial contribution to the economy and society
- Value contribution for all stakeholder groups
- Promotion of entrepreneurship
- Commitment as an employer
- Ethical behaviour
- Supporting organisations, projects and events with shared values

Trafag sensors & controls
Industriestrasse 11
8608 Bubikon
Switzerland

+41 44 922 32 32
trafag.com

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