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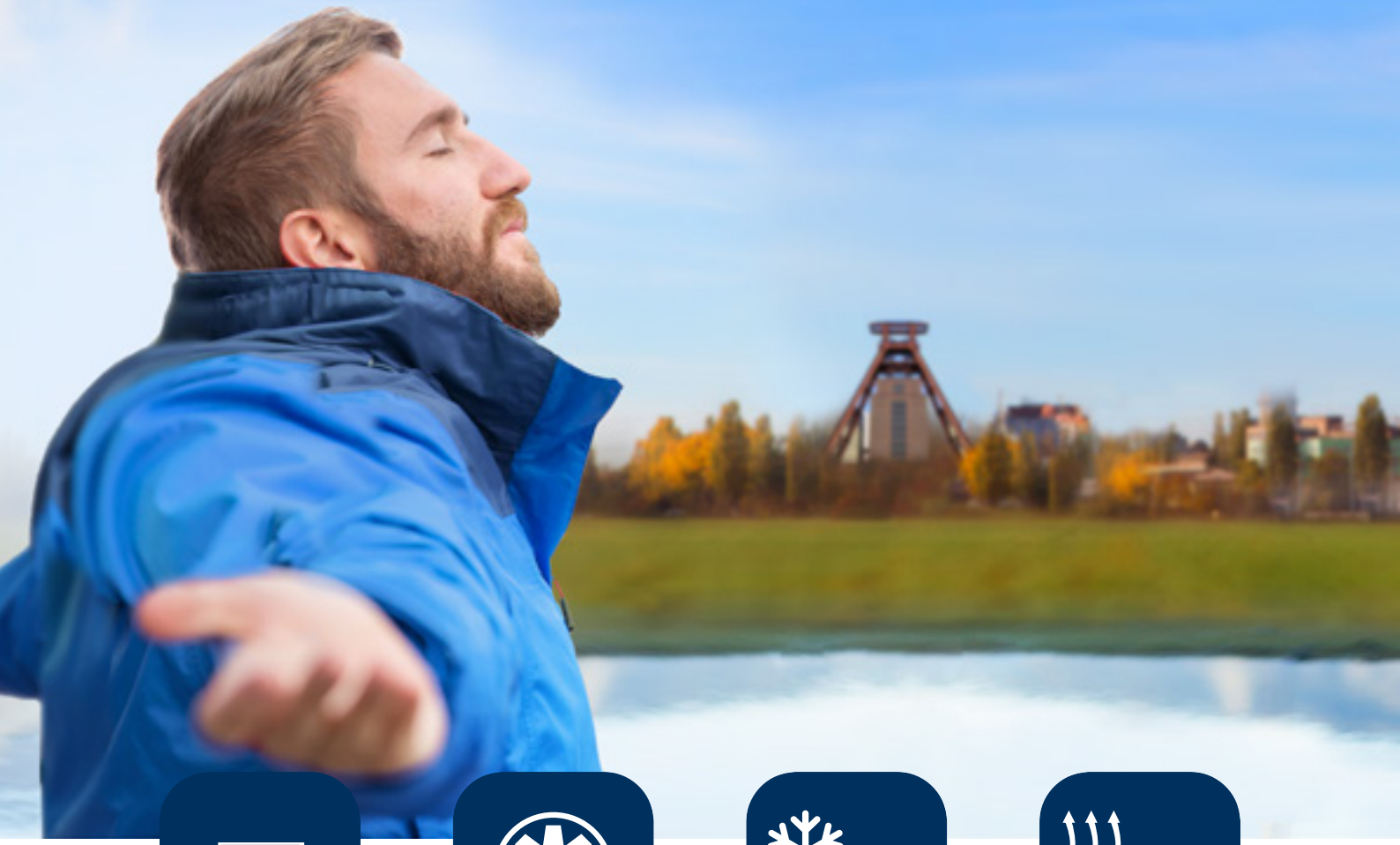
Compact Filter Technic

# BREATHE THE DIFFERENCE



Dedusting

Ventilation

Air cooling systems

Air heating systems

www.cft-gmbh.de

# CFT – A PILLAR OF THE CFH GROUP

## Clean air is our mission

Through our many years of experience and the close relationship with our customers, we have an excelent understanding of the processes in mining and tunnelling. We know how strenuous the tasks are that underground personnel have to perform and we know how extreme the conditions can be that man and machine are subjected to. Our contribution is to make these tasks more acceptable and healthier. Moreover, our technology is designed to ensure compliance with all national and international legal limits for inhalable and respirable dust.

Air–its cleaning, provision, heating, cooling and moving–is our mission. In this respect we are able to support our customers with our wealth of knowledge, gathered over decades, with technical expertise and innovative strength. Now–and in future.

Tomorrow's greatest challenges will be mobility and energy. As the global economies grow and populations expand, so the numbers of passengers and goods will also increase constantly. Thus the traffic infrastructures of the future will also have to be designed increasingly for underground operations. Furthermore, the future demand for raw materials will also continue to increase. The underground mining of raw materials forms the basis for rapidly increasing wealth and for industrial added value worldwide. This means that in future an increase in the extraction of raw materials can also be expected.

We at CFT will be glad to take on these international challenges for you! Regardless of the depth to which you need our expertise or under what climatic conditions–we ensure that you and your employees enjoy the best possible air conditions at the workplace. To this end we are at your disposal with durable and sustainable dedusting and ventilation systems as well as systems for heating and cooling the air. All CFT solutions are made in Germany and designed to protect the environment and preserve resources–and that includes complex turnkey solutions and complete package systems.

We have already set our course for the future – with the forthcoming construction of our new factory in Marl (NRW) we ensure that our capacities keep pace with the growth of our company in the coming decades. In particular, we have created a needs-based, expanded working environment for the increasingly complex area of plant engineering.

Together with you we want to look to the future and be a fair and dedicated partner for you in every respect.

With a hearty "Glückauf" (traditional German miner's greeting)!

Your team of experts from CFT GmbH Compact Filter Technic

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# System solutions for the highest standards: CFT GmbH Compact Filter Technic

CFT is a future-oriented, internationally aligned, family-owned company. We have been supporting our customers since 1999 as a competent solution provider with a range of ventilation products for occupational health and safety and the protection of the environment.

With our well-versed and qualified employees, we develop bespoke systems and complete concepts that are precisely and flexibly tailored to your individual requirements. As our customer, you benefit from our sound experience in complex projects and in the coordination and integration into existing plants, situations and systems.

One of our innovative solutions is the option of „smart" control of the systems. Our modern CFT Smart Filter online control system enables a direct reaction to changes. Data can be accessed at any time, problems detected at an early stage and operating times optimised. Online and from wherever you like.

With our many years of experience, we continually strive to develop our expertise. That means always orientating ourselves to the optimum solution for our customers. Our own high standards require that we design and supply high-quality, safe and cost-effective products and services.

» With every new task we take on the challenges that the project brings. That's what makes us different. That way we can guarantee to meet our customers' tight schedules and ensure that we act optimally in the interests of the project. «

Markus Thomeczek, Member of the Executive Board

In so doing, we offer our customers flexible and attractive options – not only in the purchase of a CFT system, but also in the area of rentals, leasing and finance.

## CFT – certainly the right decision

All CFT products are available in explosion-proof versions. We also hold many international certificates of conformity, including for China, Russia, Kazakhstan, the Ukraine, Europe and the USA.



# Achieve cleaning efficiencies of virtually 100 %, irrespective of the dust concentration: our dry dedusters

CFT dry dedusters are used wherever the highest standards of breathing air are required – therefore they are predestined for use in mining and tunnelling, for example. Residual dust contents of less than 0.05 mg/m³ are achieved, regardless of the dust quantity present. Our product range includes filter material qualities for the separation of special dusts such as quartz, diesel particles, asbestos and metal dusts up to HEPA13.

We have designed, manufactured and delivered around 3,500 turnkey dedusting systems. Our long-life dry dedusters guarantee compliance with all applicable national and international limits for inhalable and respirable dust. We offer both compact sizes and flexible add-ons to suit your specific project. We also have considerable experience in the retrofitting our systems into existing machines.

## Your benefits at a glance:

- separation rates more than 99.99 % with durable rigid filter elements
- optimised air and dust distribution in the filter chamber due to separated raw and clean air channels
- minimum dimensions due to compact design
- low maintenance requirements, only from the clean gas side
- low power consumption due to minimum pressure losses
- low compressed air consumption due to efficient cleaning system
- approved explosion-proof and flame-proof designs available (ATEX-compliant)
- smart dust discharge systems, including patented dust/water mixing units
- outstanding energy efficiency

## Fields of application:

- for all underground production processes in mining: in tunnelling, in the extraction and processing of raw materials and in the supply and processing of building materials,
- for all types of tunnelling
- in the refurbishment of railway and road tunnels, for example
- for connection to existing machines, e.g. roadheaders, TBMs, surface miners, continuous miners, bolter miners, or Mariette Miner and blasting drives

## Individual test certificates for your system

We are committed to the quality of our products in every respect. On request, every CFT filtration system – dry, wet or dry cuttings extraction - can be tested by an independent institute and individual certificates issued to verify both the cleaning and overall efficiency.

# For maximum efficiency in the most confined spaces: our wet scrubbers

CFT wet scrubbers have proven their capabilities in dealing with the most challenging conditions for breathable air, for example in coal mining or in operations using sprayed concrete. They also have a worldwide reputation for reliability in special applications.

Cleaning efficiencies of up to 99.5 % are achieved at relatively low investment costs. Even more convincing, our wet scrubbers can be easily integrated into existing technical systems thanks to their compact design. A further advantage is the low operating cost as a result of targeted reduction of the consumption of resources such as power and water.

## Applications:

- in particular for moist and wet operating conditions
- preferably with inert dusts
- for integration into existing machines, e.g. roadheaders, TBMs, surface miners, continuous miners, bolter miners, etc.
- for sprayed concrete work
- for process plants, e.g. belt transfer stations






# Guarantees virtually complete collection of cuttings: our high-performance CTBA

Both rotary and percussive drilling machines normally use water to flush out the cuttings during operation. The disadvantages of this procedure are well-known:

- the high water consumption creates muddy floor conditions in the face area
- the slurry from the drilling leads to increased wear to the drilling machine itself
- when drilling overhead, the slurry leads to extremely poor working conditions for the operators
- under some geological conditions the water causes the ground to swell, thereby endangering the integrity of the roof support.

Sometimes drilling takes place in areas where the climatic conditions prevent the use of water – for example at temperatures below freezing or in arid regions.

To avoid these disadvantages, we have developed our innovative dry cuttings extraction system: the CTBA.

The heart of this innovative and patented solution is the combination of a highly efficient rotary piston blower with a compact high-performance dry deduster. No dust escapes to the atmosphere because the cuttings which are blown out of the hole are captured and removed by the filter. Our dry cuttings extraction systems guarantee almost complete entrainment of the cuttings – and thus decisive advantages with regard to occupational health and safety as well as efficiency.

» Our CTBA makes drilling without water possible. Thus, we make a significant contribution to the simplification of the drilling processes and, where applicable, to an improvement in the integrity of the roof support in mining and tunnelling.“ «

Mike Brill, Project Manager

# Provide for fresh air above and below ground at all times: fans and accessories

One of our core areas of activity is the primary ventilation of underground mines. Our main mine fans operate above and below ground as single and multiple units in series or as a block. We create intelligent bespoke solutions, tailored to the respective project requirements and for the energy-efficient operation. For example, our main mine fan stations are characterised by mechanical blade adjustment during operation and the use of variable frequency drives.

Furthermore, we are able to provide our customers with a range of accessories such as shut-off valves and duct connecting and transition elements.

» Our customers' projects are highly complex. That's why we at CFT specialise more and more in tailored package solutions. That way we can call on a versatile range and offer system solutions for every requirement.

Dr. Reinhold Both, Managing Director

When it comes to auxiliary fans, we can also call on decades of experience. Since 2001, we have built and supplied approx. 2,000 Korfmann fans for main and secondary ventilation in mining and tunnelling – from project planning to delivery. However, the experience of the CFH associate company stretches much further back: Before CFH became a shareholder in the newly-formed company Korfmann Lufttechnik GmbH in 2001, the predecessor, Maschinenfabrik Korfmann, had already placed more than 30,000 systems in mining and tunnelling applications during a company history of more than 120 years.

For tunnelling applications, we also supply portal fans – if necessary with variable frequency drives – as well as booster fans and flushing fans that increase the air speed or pressure in the duct or tunnel cross-section.

Every fan is thoroughly tested at our in-house fan testing facilities before delivery. Certificates of conformity to national and international mining and tunnelling standards are available.



## A multitude of applications for axial fans:

- main mine fans
- portal fans
- booster fans
- fans as part of a dedusting system
- auxiliary fans
- flushing fans
- fans for cooling and heating systems

# Ensuring maximum safety and clean air in tunnels: our jet and smoke extraction fans in action

Reliable ventilation is essential for the safe and smooth operation of road, metro, and railway tunnels. With our jet and smoke extraction fans, CFT meets the highest technical standards in terms of safety, efficiency, and durability.

## Jet fans

The ventilation of road tunnels is crucial to prevent the accumulation of vehicle exhaust gases and to maintain air quality inside the tunnel. With the increasing number of electric vehicles, smoke extraction in the event of a fire is becoming even more important.

To ensure adequate ventilation during tunnel operation and smoke-free escape routes in case of fire, we provide worldwide support with our CFT jet fans of the SATM series.

## Smoke extraction fans

More and more people are moving to the world's economic hubs, leading to increasing passenger numbers and growing demand for public transport. Not only passenger traffic but also the underground transport of goods – sometimes with potentially flammable cargo – is increasing.

In metro and railway tunnels, CFT smoke extraction fans of the SARM series provide the necessary safety in case of fire while ensuring a sufficient supply of fresh air at the same time.

**Ventilation system**
up to 55 °C continuous ambient temperature

**Fire gas**
up to 400 °C/120 min

**Sizes**
from 630 to 2,500 mm



# Your advantages at a glance:

## Our new SATM & SARM fan series reliably meet the highest technical demands in terms of safety, efficiency and durability.

**Robust and durable fans due to high-quality construction:**

- High breaking strength due to welded impellers made of stainless steel or steel
- Maximum flexibility by means of fully reversible impeller blades at standstill
- Durable corrosion protection (powder-coated / hot-dip galvanised / stainless steel up to AISI 316)
- Customised product configurations with modular construction

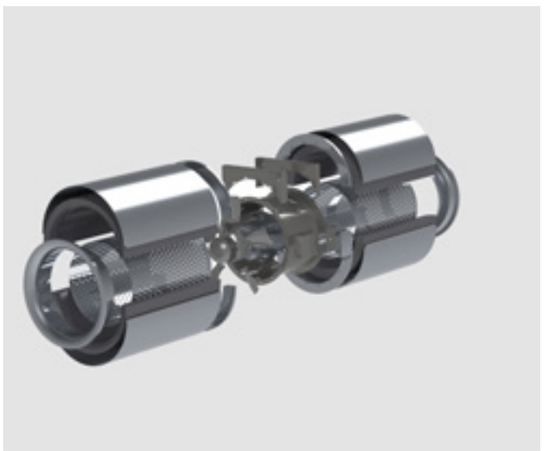
**Minimised operating costs due to innovative, CFD*-optimised design:**

- Aerodynamic shape of the entire impeller for maximum efficiency
- High efficiency due to minimal gap dimensions
- Whisper operation as a result of high-performance silencers
- Maximum thrust

**Maximum safety creates worldwide application possibilities:**

- Compliance with fire protection classes F300 and F400
- CE certification as per EN 12101-3:2015

*CFD (Computational Fluid Dynamics)



# Offering modular combination options: our mine air cooling solutions

Climate control in the form of mine air cooling is fundamental in mining, tunnelling and other civil engineering applications. The mine air temperature here may not exceed the prescribed limit. The real challenge is not to „destroy" the excess heat but to transport it elsewhere.

CFT has firmly established itself on the market as an innovative solution provider for this field of applications. We design and supply complete mine air cooling systems together with WAT Wärme-Austausch-Technik GmbH, a company in which CFH holds an equity stake. Depending on the application, we can offer our customers either centralised or decentralised cooling systems. Cooling capacities of up to 4 MW are available with individual systems and over 30 MW per project with complete installations.


» Protection of the environment is important to us – and not just within our own production chain. When designing our systems, we always pay attention to potential energy saving measures and the resulting reduction of our customer's operating costs. «

Jürgen Waller, Member of the Executive Board

Decentralised systems are designed for local use, for example directly on a tunnel boring machine (TBM). On the TBM the cooling system can be used for the cooling water of the TBM as well as for cooling of the air. Centralised systems are mainly used for cooling a complete mine or a larger area with a network of pipes connecting the individual system components for refrigeration, air cooling and recooling. Our systems can be adapted for underground and surface installation through modular combination options.


# Overview of air cooling systems:

## Refrigeration systems for mining and tunnelling

**Water chillers**

- central cooling system with indirect evaporation
- injection evaporators and high-pressure condensers

**Compact water chillers**

- local cooling system with indirect evaporation

**Air coolers**

- local cooling with direct evaporation
- air cooling without additional water circulation

## Air/water heat exchangers for mining and tunnelling

**Air coolers**

- spot coolers (variable design)
- face coolers (smallest design)

**Recoolers**

- alternative recooling, especially underground

The CFT portfolio also includes high-pressure/low-pressure heat exchangers for underground, recooling plants (e.g. cooling towers) and special solutions such as pumping stations and refrigeration systems for surface installation (e.g. air-cooled water chillers). All the equipment is also available in containerised design.

## Engineering services for mine air cooling

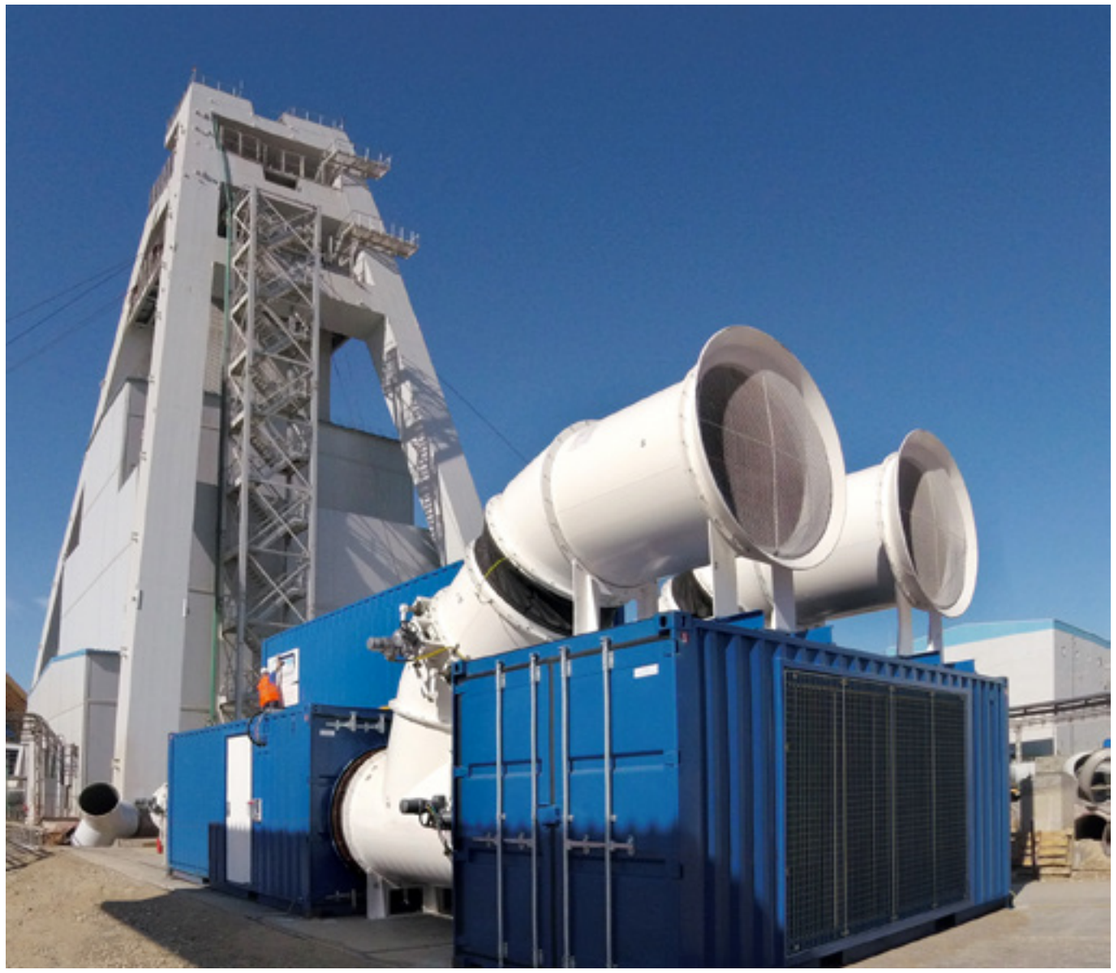
Climate forecast calculation, specification of air cooling systems, cooling water and refrigeration systems, project engineering for the cooling system and PLC programming – we take care of all the engineering for you.

# In action to provide comfortable temperatures under extreme conditions: our mine air heating systems

Often, extreme temperature conditions can hinder the supply of fresh air considerably. That is especially the case in mining. The climatic conditions at the face and the local regulations commonly necessitate raising the temperature of the air entering the mine via the shaft by way of an air heating system. The temperature of the incoming air must not drop below 2 degrees Celsius.

Here, CFT mine air heating systems do a very good job. Heating capacities of up to 3 MW can be achieved with individual systems and over 30 MW per project with complete installations. The core of the concept is a mine air heating system supplied by our partner Egger Apparatebau e.K. CFT has the exclusive marketing rights for these system components for the mining and tunnelling industries.

Normally our mine air heating systems comprise one or more banks of heating coils together with the appropriate fan stations. The energy for the heating coils can be provided by electricity, gas or hot water. Depending on the application and air flow requirements, the heating systems can be either be designed as local decentralised units or as centralised main mine air heating systems.



» In 2022, we moved to our new company location in Marl as the CFH Group.Here, we not only have more than 7,500 m² of production space at our disposal, but we are also very proud of the world's largest fan chamber test stand. Sustainability is important to us not only in our plants, but also in the construction of our new location. It is heated and cooled by geothermal energy and supplied with electricity from our photovoltaic system. «

Corinna Both-Kreiser, Partner of the CFH Group

# For clean air just-in-time: our tunnel refurbishment services


In the field of rail and road tunnel refurbishment, no two projects are the same. However, they do have one thing in common: the time factor. It is essential to avoid work delays and standstills as a result of workplace exposure limits being exceeded due to diesel emissions and dust particles. With our flexible, innovative solutions and our many years of experience, we are therefore the perfect partner for you.

»If required by the project, we support our customers with our expertise directly on site – worldwide. Personal contact is important for developing ideal solutions. This results in long-standing partnerships and a cooperation based on trust.«

Patrick Schneider, Member of the Executive Board

With our expertise in the field of ventilation and state-of-the-art technologies, we supervise tunnel refurbishment projects with regard to dedusting and ventilation in order to guarantee the consistent compliance with workplace exposure limits for respirable air on construction sites. We always focus on ensuring that our installed ventilation and dedusting systems do not interfere with site operations or with any public traffic that may be running in parallel. Construction site operations must run absolutely on schedule in order to minimize the impact on rail traffic.



# CFT dedusting and ventilation expertise in the refurbishment of tunnels:

- Since 2006 we have successfully provided ventilation and, in some cases, also dedusting for more than 400 national and international projects in railway and metro tunnels, with both stationary and mobile solutions.
- We offer customized turnkey solutions that cover all aspects: from planning, assembly, and dismantling, including rail-bound logistics, to the operation of ventilation systems and measurement technology.

  In addition, we can install modern personnel tracking systems that provide an overview of the number and location of individuals on the construction site. These systems provide critical information to emergency responders in case of emergencies, enabling efficient rescue and evacuation operations.
- Our ventilation and dedusting systems are used in tunnels in the intercity rail traffic, including the high-speed lines of the Deutsche Bahn as well as inner-city underground and suburban railways of regional transport companies.
- We have already provided ventilation for tunnels with lengths of up to 10 km.
- On request, we can independently take over the operation and control of the systems for periods ranging from a few days to several months with our expert staff.
- We have an extensive network of special service providers for the fast and reliable implementation of projects.
- We can access to an extensive range of equipment at any time in order to meet the customer specifications.
- The design of our ventilation systems always complies with the applicable regulations.
- With the aid of our CFT measuring kit we are able to record the data permanently and thereby provide auditable documentation of the air quality on the construction site.
- Our ventilation systems are monitored and controlled via a digital remote data transmission system, which ensures fast response times and provides a continuous overview of the air quality on the construction site.

# Securing your investment across the board: our services

Whether during the initial assembly or commissioning, for routine maintenance or rapid response in emergencies, you can count on us 100 % – even after you have invested in our equipment. Our “clean air” specialists travel the world, are readily available and undergo continuous product training to ensure they are all familiar with the latest technological developments. This is essential – original CFT technology is best supported by original CFT service.

Service contracts offer the greatest degree of certainty when it comes to the technical and economic reliability of the equipment in operation. A painstaking maintenance regime offers both protection against unscheduled down-time and improved workplace safety for your personnel.

Our spare parts service ensures that you are supplied quickly and reliably with spare parts anywhere in the world. With our in-house workshop we are able to offer a unique combination of off-the-shelf CFT original spare parts, CFT expertise and qualified CFT personnel – you can rely on the highest degrees of professionalism and efficiency.



## An overview of CFT services:

- on-site assembly guidance / supervision
- on-site assembly assistance
- commissioning and product familiarisation
- control and operation during the construction period
- training / training courses
- inspection / maintenance
- repair / overhaul
- supply of spare and wear parts
- measurement and monitoring of contaminants

# Reduces energy costs and improves energy efficiency: ENERGIFY optimizes steam processes

Sustainability is more important than ever. ENERGIFY optimizes your steam processes and reduces your external energy requirements.

Our patented technology reduces energy procurement costs by converting pressure differences and inlet pressures in steam networks starting from 0.5 bar into electricity. Unused pressure and heat energy is connected to a generator in a unit (rotary piston expander), which produces electricity and expands the steam. After expansion, the steam has the required pressure for downstream consumers and heat exchangers.

ENERGIFY can be integrated into all steam networks and is compatible with various steam generation methods. In this way, the system ensures a reduction in external electricity procurement without disrupting the production process.

**Good to know:** The power generation costs of the ENERGIFY system are significantly lower than those of solar or wind power plants. Depending on the local situation in the steam network, investment grants may be available, and in some cases, a partial refund of the gas tax is possible.

»Thanks to the significant savings potential, short payback periods can be achieved—even without government subsidies.«

Selcuk Aslan, Product Manager



## Key features

- ENERGIFY offers power outputs ranging from 10 kW to 1,000 kW, utilizing inlet pressures of up to 15 bar and pressure differences starting from 500 mbar. Each module can process steam flows of up to 20 tons.
- The technology is suitable for saturated steam, wet steam, superheated steam, and gaseous media and handles strong steam fluctuations effortlessly.
- Significant cost savings and short payback periods ensure a strong return on investment.
- The proven core technology requires minimal maintenance and servicing.
- Fully automated operation makes the system particularly efficient, as no operating personnel are needed.
- No expansion of the electrical infrastructure is required for on-site power generation.

## Application Areas:

**Pressure Reduction**

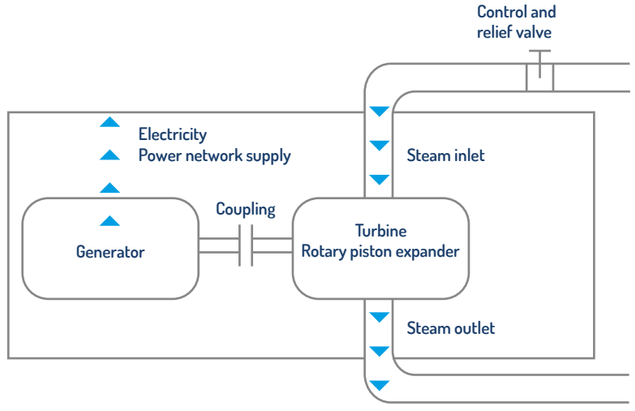
- Operates in parallel with a pressure reduction station (bypass)
- Continuous, stable operation without disruptions
- Inlet and outlet pressures remain constant

**Pressure Optimization**

- More efficient energy generation directly at the boiler system through slight pressure increases
- The required production pressure as an output value is guaranteed/maintained

**Utilization of Residual Steam**

- Uses residual steam in front of the condenser for $CO_2$-neutral power generation
- Works effectively even at very low pressures starting from 0.5 bar




ENERGIFY
ENERGISE YOUR PROCESS

# Optimum networking of competence: the CFH Group

The CFH Group unites subsidiaries and affiliates under a single umbrella that have one thing in common: excellent engineering services that enable innovative solutions in the field of air as well as in the fields of energy and the environment. CFT GmbH Compact Filter Technic has been a wholly-owned subsidiary of the CFH Group since 2008.

Our group of companies is characterised by a family-style corporate culture. Our vision „Breathe the Difference" forms the basis for this. For us that means: We want to support our customers with products and services that make a decisive difference in all air-related tasks. For all industries, above ground, below ground and across the globe.

Thanks to this structure, our expertise is perfectly networked. The international presence of the CFH Group ensures that our know-how is available to our customers, wherever and whenever they may need it. Our wealth of knowledge and experience complement each other directly. Our customers reap the benefit from the resulting improvements in efficiency and economy.

## Overview of the services of the CFH Group:


## Country-specific product representations through CFH subsidiaries:

**Kazakhstan**
- Conveyor belts
- Mobile hydraulics
- Shaft winding machines
- Shaft sinking
- Heading
- Roller and plain bearings

**Poland**
- Biogas from straw
- Dispensers
- Fiberglass ducting

Further information on the holding and shareholdings can be found at **www.cfh-group.de**.



CFH HOLDING

| | | | |
|---|---|---|---|
| CFT Compact Filter Technic 100 % | DFT Deichmann Filter Technik 100 % | Korfmann Lufttechnik GmbH 100 % | WAT 49,01 % |
| PTC PARFORCE Technology Cooperation 51 % | CFH Immobilien 100 % | CFT France 100 % | CFT Polska 80 % |
| CFT Kazakhstan 51 % | CFT MM3 50 % | CFH RUS 80 % | SFB System 40,4 % |
| CFH Australia 66,67 % | CFH China 100 % | Tiandi CFT Technology 49 % | |

Corinna Both-Kreiser
Partner

Dr. Reinhold Both
CEO & Partner

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# BREATHE NOW – TALK TO US!

Get in touch! We're sure to have a suitable contact person for all your needs. Our staff will be glad to advise you in English, Russian, Chinese, French, Spanish, Italian, Turkish and Polish.

Visit us at the industry's national and international trade fairs. More on our trade fair participations, further general information and contact details relevant to you can be either be obtained personally from our CFT head office or alternatively online from our website.

We are always interested in your projects and look forward to hearing from you!

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MADE IN GERMANY

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