contact
KNOWLEDGE MAGAZINE BY TÜV RHEINLAND
03.15

LEND ME YOUR EARS

How noise impacts on our lives and what is being done to reduce it

HEAD IN THE CLOUDS

Drones are being increasingly deployed for testing purposes

COUNTING STEPS

What companies do to ensure their employees keep in shape

TÜVRheinland®
Precisely Right.

LISTEN CAREFULLY

Ready for a small experiment? Close your eyes for a moment and listen carefully. So – what did you hear? Probably quite a lot – for most people there's no such thing as complete silence any more. It's become something of a luxury. Instead we are surrounded by a barrage of diverse sounds, day and night – whether it's the hum of traffic, the hammering of construction machines or the beeping of mobile phones. In other words: noise.

But should we be complaining? Not really. After all, it was us that got ourselves into this situation: we live in suburbs and commute to work in cars, buses and trains. We have goods flown to us from all over the world at the click of a mouse, and then they're delivered to our doorstep in trucks. And when we do want a spot of peace and quiet, we speed off half way round the world in an aircraft. Mobility is one of mankind's fundamental needs and a key driving force behind economic growth. But rising noise levels is the price we pay.

In the cover story of this issue of contact you can find out why noise bothers us, makes us sick and ultimately costs society billions of euros per year. But you can also read about why it's worthwhile for companies to combat noise and what strategies and techniques they can use to win the battle some day.

I wish you a quiet and undisturbed read.

Yours

Michael Fübi

Dr.-Ing. Michael Fübi,
Chairman of the Executive Board
of Management of TÜV Rheinland AG

KNOWLEDGE

04 QUIET PLEASE!

Freight trains, jackhammers or jet planes – the noise level meter hits the ceiling every day of our lives. Any investment in noise protection technology and measures is worthwhile – not just for health reasons.

HEADS

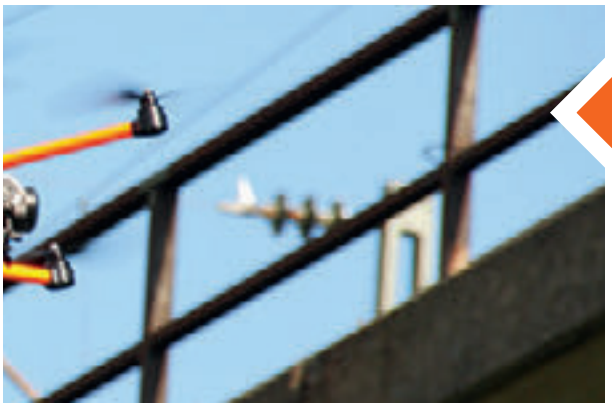
36 PIMP MY CAR

He can turn the dullest four-wheeler into a sizzling road runner or transform a VW bus into a surfboard – and every car he works his magic on reflects his own distinct style: Sidney Hoffmann – the ultimate tuning expert. We interviewed him to find out how he ended up in the tuning trade and which vehicles are still missing from his collection.

GLOBAL

24 LET'S GET MOVING ...

Exercise is healthy, we all know that. But often our weaker selves win over when it comes to pursuing a healthy lifestyle. There's an easy way for companies to get their staff moving during working hours: all they have to do is send them on a virtual walk from Santiago de Compostela to Lisbon.

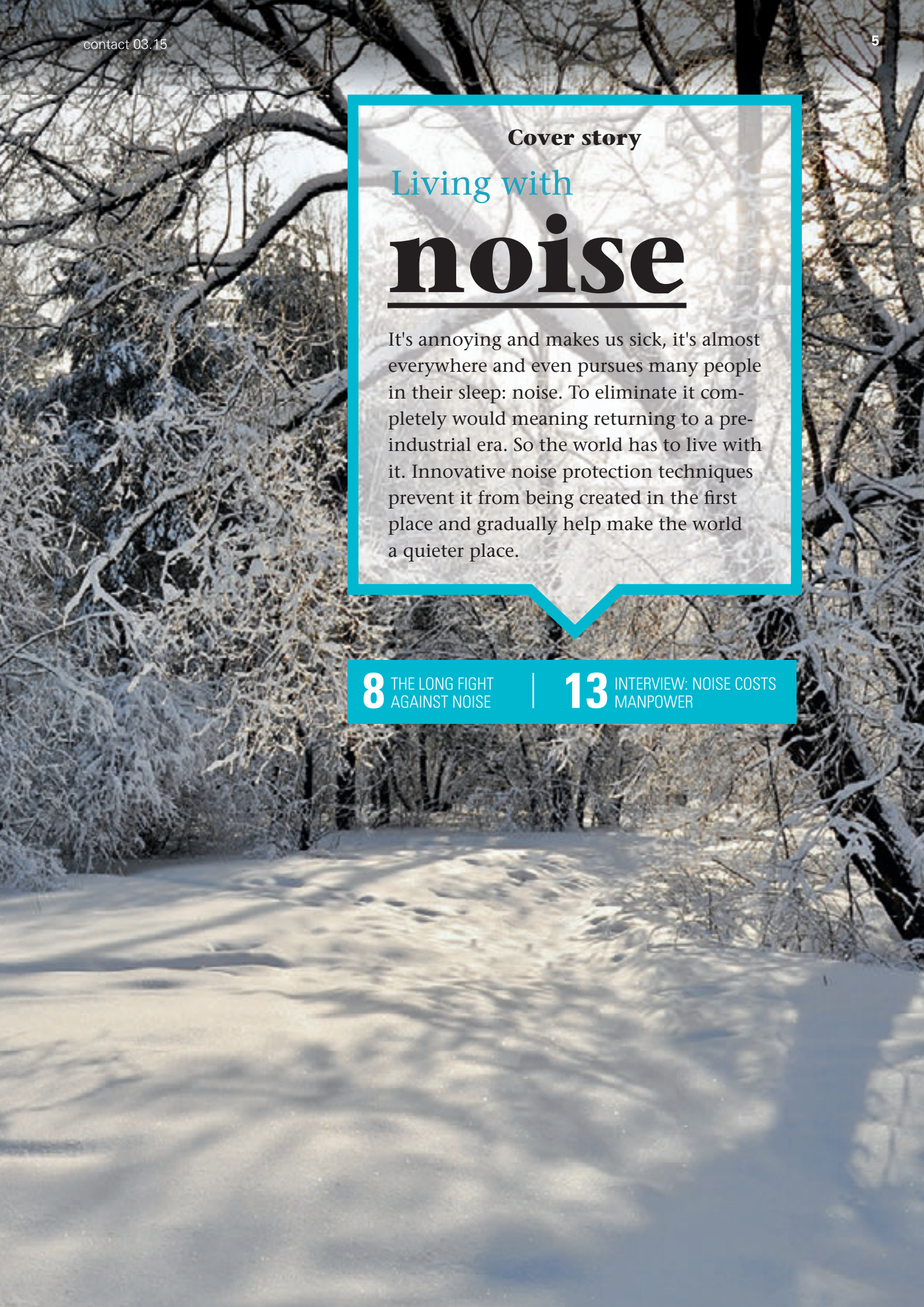


GLOBAL

20 DRONE RANGER

Bird's-eye view: getting a fresh perspective on things is all the rage these days. Unmanned aerial vehicles can supply fascinating images and videos from lofty heights. In addition to hobby aircraft enthusiasts, more and more companies are now taking to the skies, too. There's certainly no end to the possibilities. However, one thing that is missing is a clear set of rules.

Turn the volume down, please! There are fewer and fewer truly quiet places in the world. In Europe alone, an estimated 125 million people are exposed to the detrimental impact of noise every day.



Cover story

Living with noise

It's annoying and makes us sick, it's almost everywhere and even pursues many people in their sleep: noise. To eliminate it completely would meaning returning to a pre-industrial era. So the world has to live with it. Innovative noise protection techniques prevent it from being created in the first place and gradually help make the world a quieter place.

Noise is omnipresent and will continue to increase. This is the price of our mobile lifestyle and our economic system based on the global flow of goods. Then there are new sources of noise that constantly appear – we may appreciate their benefits, but the noise they create bothers us nonetheless. These include foliage vacuums, mobile phones and large-scale events – all things that don't give us a minute of peace. Tranquility has become a luxury asset.

How about more quiet?

The world is becoming noisier. Traffic is the main cause of it. It creates a constant barrage of noise that makes many people sick. The fight against one of the biggest environmental problems of our time is already well underway.

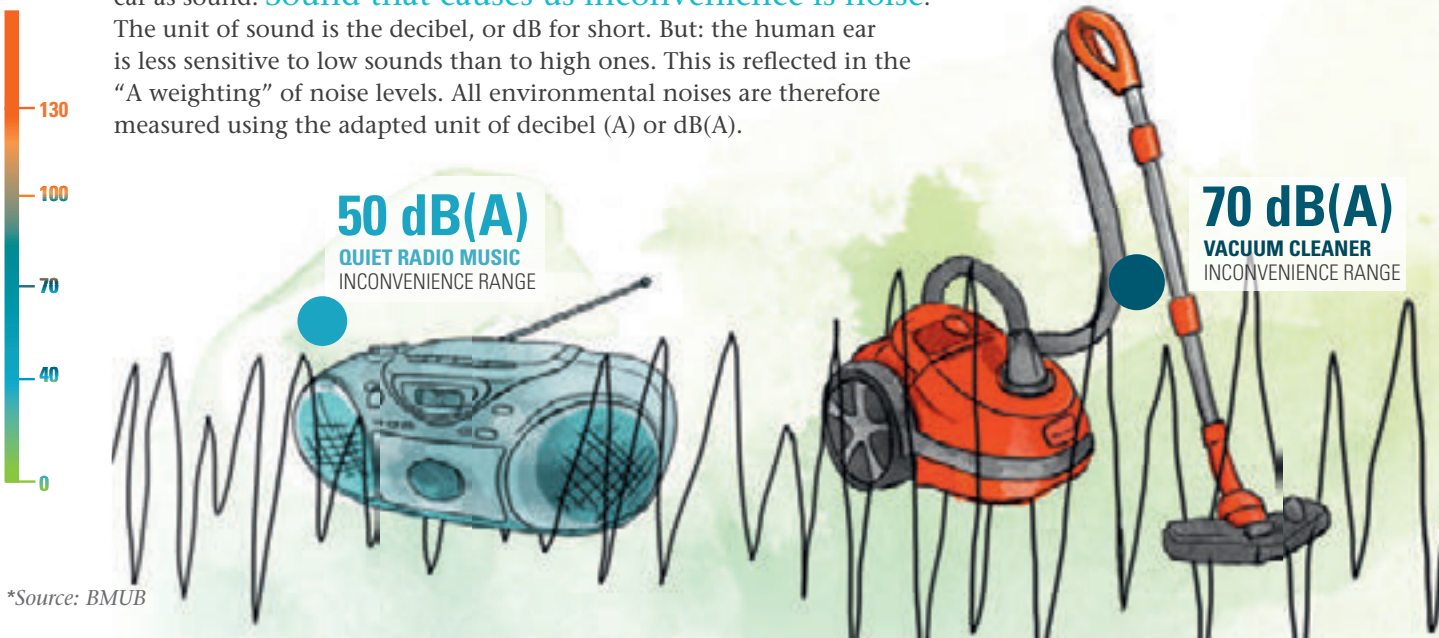
The latest defense against aircraft noise measures just a few centimeters. You have to look very closely to make out the so-called vortex generator on the huge wing of an Airbus A320. But the small corrugated metal plate is highly effective. Bolted on in front of the tank pressure equalization hole – a round opening underneath the wing – it prevents oncoming air from making a loud, high sound – similar to blowing across the top of a bottle. This reduces the noise of a landing aircraft by up to 4 decibels (A) – a definite improvement given that a difference of 10 dB(A) is equal to halving the noise level. Lufthansa has been retrofitting its A320 fleet with this internally developed component since 2014. It will help make the world a little quieter – an urgent undertaking. As early as 1910, German physician Robert Koch predicted: "One day mankind will have to combat noise just as relentlessly as cholera and the plague." Today, in its Green Paper on noise protection policy the EU Commission declares noise to be "one of the biggest environmental problems in Europe"*. But what actually is noise? "Sound is a physical phenomenon. Noise is sound that causes inconvenience and makes people sick," says Dr. Wiete Schramm, occupational physician with TÜV Rheinland (see interview). And nowadays noise is omnipresent. Thirteen million Germans are exposed to a level of noise both day and night that is damaging to their health. Some five million work under noise exposure. Throughout Europe there are an estimated 125 million people who suffer constant exposure to noise – in other words one in four of the total population.

NOISE COSTS BILLIONS

Irritating sound is damaging to both people and the economy. Job-related loss of hearing is suspected in around 13,000 employees per year here in Germany. There are about 7,000 cases of noise-induced hearing loss, making this by far the most commonly recog-

NOISE SOURCES AND THEIR LEVELS

Stimulated for instance by a violin string or our vocal chords, oscillating air particles cause fluctuations in air pressure. These are perceived by the ear as sound. Sound that causes us inconvenience is noise. The unit of sound is the decibel, or dB for short. But: the human ear is less sensitive to low sounds than to high ones. This is reflected in the "A weighting" of noise levels. All environmental noises are therefore measured using the adapted unit of decibel (A) or dB(A).



*Source: BMUB

Noise protection is worthwhile: Noise-induced hearing loss is the most commonly diagnosed occupational disease. At up to 90 dB, the noise exposure involved in welding work is within the range that is damaging to health.

nized occupational disease. An estimated three million Germans can't get the noise out of their head – they suffer from tinnitus. The cost of noise – retraining programs, therapies, hearing aids, work incapacity, early retirement – is estimated by the EU to be between 0.2 and 2 percent of the gross domestic product in Europe as a whole. For Germany alone this would mean a figure of between 6 and 60 billion euros per year.

IT'S WORTH KEEPING QUIET

So it's worthwhile to invest in noise protection. But where do you start?

Listening sample
"4'33" by John Cage, played by the BBC Symphony Orchestra: ***https://youtu.be/zY7UK-6aaNA***

THE SOUND OF SILENCE

JOHN CAGE LISTENS VERY CLOSELY

Art is also concerned with the issue of what is silence and what is noise. In music, for example, silence is an important component of any composition. Musical notation has special symbols to denote interruptions in the sound, when an instrument or an entire orchestra pauses. Silence creates tension and generates the space in which the notes can take effect on listeners. American avant-garde composer John Cage (1912–1992) was particularly fascinated by silence. Probably his best-known composition, first performed in 1952, is "4'33": it is based on the instruction that all instruments are to remain tacet for the entire duration of the piece. So the musicians don't actually do anything when the work is performed. In this way, John Cage turns chance environmental sounds into music – be it the coughing of audience members, a creaking seat or the whirring of the air conditioning. The composer himself said: "What silence and noise have in common is the lack of intention and this is the state that interests me." He also claimed that there was no such thing as absolute silence. The sound of one's own breath, the rustling of leaves or the roar of traffic – all this is fascinating music according to Cage: "There will be noise until I die. And this noise will outlast me. We do not need to fear for the future of music."

The electrically powered BMW i3: looks like a car, sounds like a space ship.

For many years, passive noise protection was the priority: headsets for workers, noise protection walls along highways and railway lines and sound insulating windows in the home – these were all designed to keep noise out. But this is no longer enough. The principle now is: noise shouldn't happen in the first place. According to the EU Machinery Directive, for example, devices must be designed so that they operate as quietly as possible. Manufacturers also have to provide noise level specifications if the dangerous threshold of 80 dB(A) is crossed. "Quiet machines are a competitive advantage: companies that purchase quiet appliances are protecting the health and work capacity of their employees," says Wiete Schramm.

TRAFFIC CALMING 2.0

However, machine tools, construction sites and the neighbor's dog are not the main problem. The number one source of noise is traffic. Take the example of the rail traffic: it is predicted to increase by more than 40 percent in Germany by 2030. Yet passive noise protection along railway lines and houses is only sporadically effective and has its price: one kilometer of noise protection wall costs between 1.1 and 1.6 million euros. "It is more sustainable to combat noise at its source," says Thomas Quernheim, rail technology expert with TÜV Rheinland. He advises the state sector on noise protection in the field of rail transport.

Continued on page 12

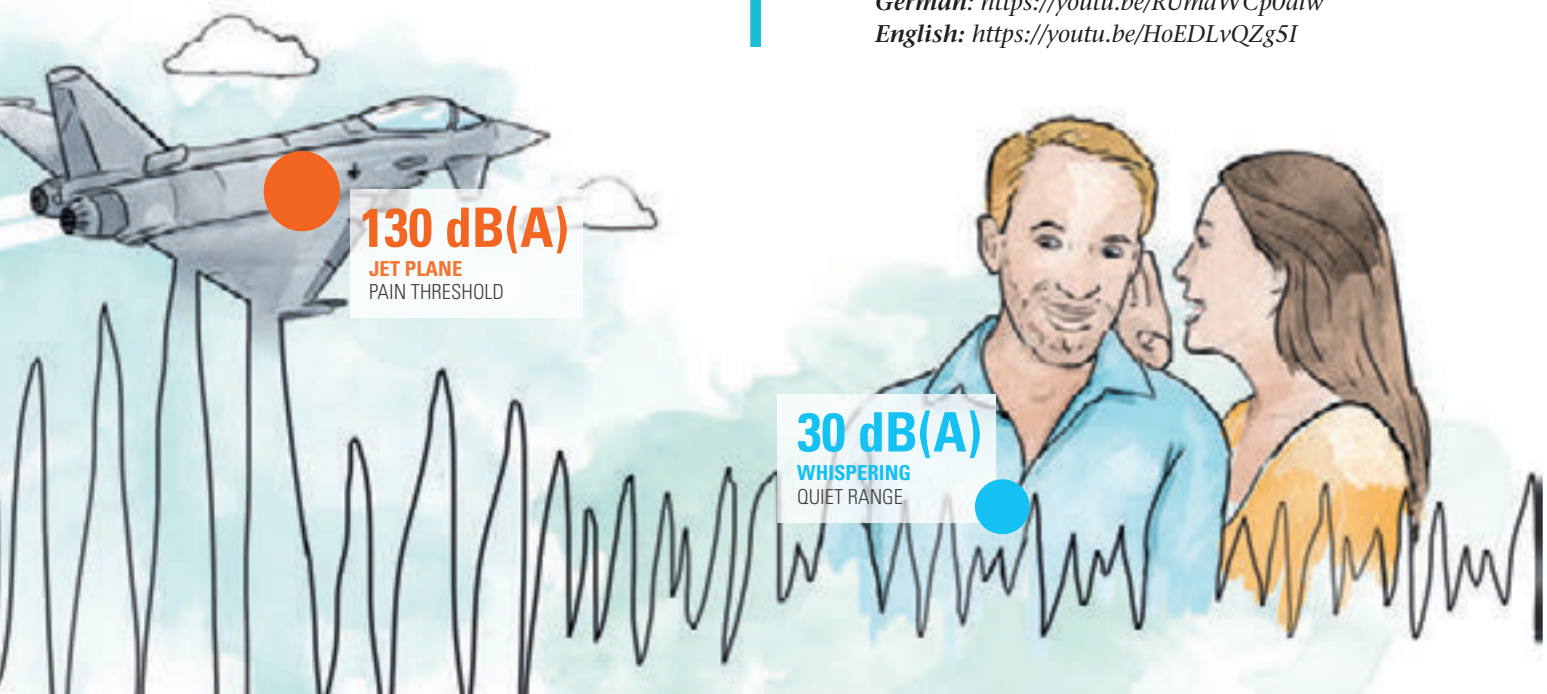
DANGEROUSLY QUIET

ARTIFICIAL SOUNDS FOR ELECTRIC CARS

Electric cars do not emit pollutants and run very quietly. But this latter point actually poses a problem. After all, pedestrians and cyclists rely on what they hear for orientation in road traffic too, and they can easily miss the gentle purr of an electric vehicle – so this is an accident risk. So starting mid-2019 all electric cars for the European market have to be fitted with an "Acoustic Vehicle Alerting System (AVAS)" – such is the EU requirement. When the car starts, a sound is to be automatically generated that increases up to a speed of 20 km/h and becomes softer when the brakes are applied, as is the case with a combustion engine. At higher speeds, tire and wind noise providing sufficient warning. AVA systems have been mandatory in the US and Japan for some time now. Additional safety can be provided by cameras integrated into the windshield which detect pedestrians and cyclists nearby. If there is a risk of collision, an exterior speaker emits a clear but discreet warning signal, rather like a bicycle bell. The desire for artificial vehicle noises is a blessing for the car brand sound designers – they are already composing individual signature tunes for each model: while Toyota's hybrid models make a rather neutral and respectable purring sound, the Audi e-tron R8 and BMW's i3 sound dynamic and futuristic – rather like space ships in take-off mode. There are limits to the possibilities, however: animal noises are not permitted, for instance.

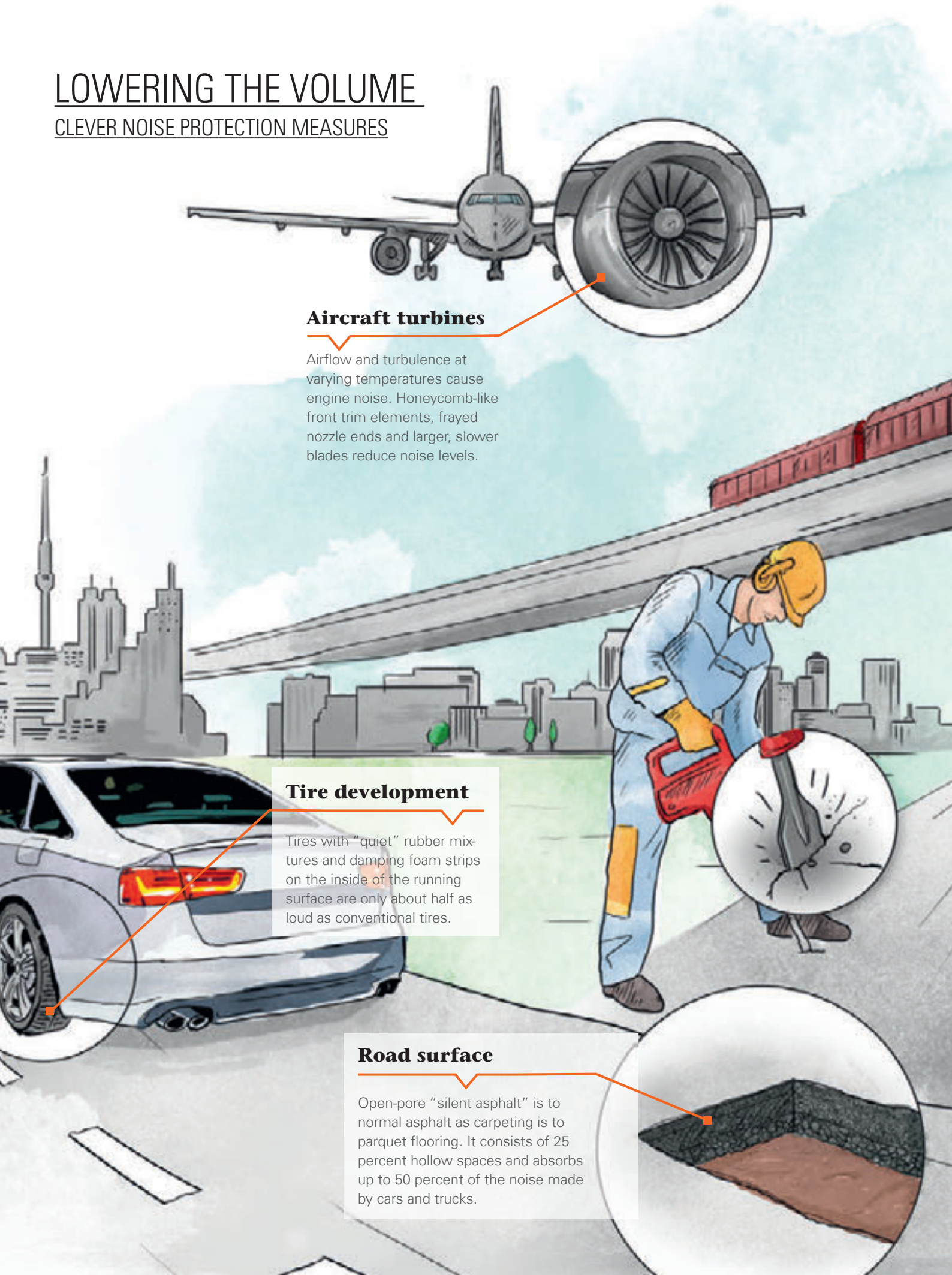
Listen for yourself:
www.motosound.de
Search terms "Toyota Hybrid", "BMW i3" and "Audi e-tron".

Sound design by Audi:
German: *https://youtu.be/RUmdWCp0diw*
English: *https://youtu.be/HoEDLvQZg5I*



LOWERING THE VOLUME

CLEVER NOISE PROTECTION MEASURES



Aircraft turbines

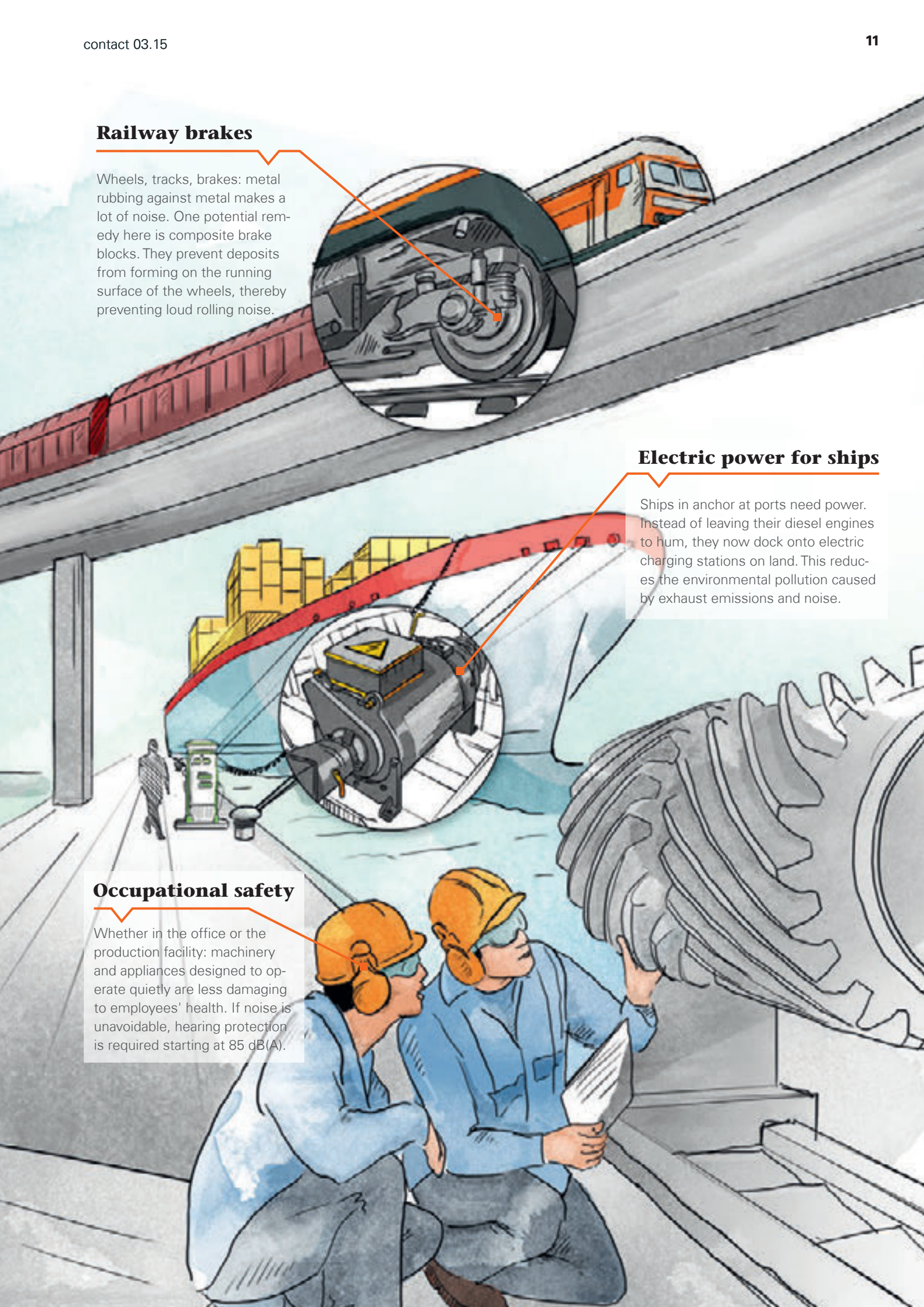
Airflow and turbulence at varying temperatures cause engine noise. Honeycomb-like front trim elements, frayed nozzle ends and larger, slower blades reduce noise levels.

Tire development

Tires with "quiet" rubber mixtures and damping foam strips on the inside of the running surface are only about half as loud as conventional tires.

Road surface

Open-pore "silent asphalt" is to normal asphalt as carpeting is to parquet flooring. It consists of 25 percent hollow spaces and absorbs up to 50 percent of the noise made by cars and trucks.



Railway brakes

Wheels, tracks, brakes: metal rubbing against metal makes a lot of noise. One potential remedy here is composite brake blocks. They prevent deposits from forming on the running surface of the wheels, thereby preventing loud rolling noise.

Electric power for ships

Ships in anchor at ports need power. Instead of leaving their diesel engines to hum, they now dock onto electric charging stations on land. This reduces the environmental pollution caused by exhaust emissions and noise.

Occupational safety

Whether in the office or the production facility: machinery and appliances designed to operate quietly are less damaging to employees' health. If noise is unavoidable, hearing protection is required starting at 85 dB(A).

Freight wagons are still often fitted with gray cast iron brake blocks which generate loud rolling noise and roughen the wheels, making them roll even more noisily. According to European licensing law, new freight wagons therefore have to be fitted with quiet, low-impact composite brake blocks. “They're relatively low-cost and reduce noise levels every step of the way,” says Quernheim. Only quiet freight wagons will be allowed in Germany from 2020 onwards. The rails themselves will also be acoustically optimized:

- Tracks will be seamlessly welded so the familiar “do-dom, do-dom” railway sound will soon be a thing of the past.
- Steel bridge constructions actually magnify the sound of a train passing over them. A remedy here is a continuously damping gravel track bed.
- Regular grinding of the rails eliminates unevenness so that trains run more quietly.

AS IF ON A CARPET

Tires with low rolling resistance and open-pore silent asphalt are currently the preferred methods of reducing road traffic noise. “Not only safety and fuel consumption are important but also noise sensitivity. Since 2012, noise has been one of the three rating factors for the EU tire labeling requirement. Low-resistance tires of the latest generation already meet the highest standards and help improve environmental conditions due to their lower fuel consumption levels and reduced noise emissions,” says Jochen Kock, Head of Fleet Consulting with TÜV Rheinland, who was involved with practical testing of low-resistance tires for the chemical corporation Lanxess. “Silent asphalt” consists of one quarter hollow spaces, absorbing half of the noise generated by cars driving over it. Up to now, however, this open-pore covering has only been used on roads with very high levels of noise pollution: silent asphalt is twice as expensive as a normal road surface. What's more, it crumbles more quickly when covered in frost and it involves a greater risk of black ice, since the road salt disappears into the pores. The aircraft industry invests particularly heavily in noise reduction. This is because loud aircraft means bans on night flying and high landing fees. It is mainly the engines that are so noisy. The faster the turbine blades turn, the more noise is created. The German Aerospace Center has developed a fan which turns more slowly: due to the optimized number and shape of the blades, it's not only quieter but is actually more powerful, too. Arched winglets and aerodynamically trimmed chassis also reduces aerodynamic drag in aircraft. Engines require less propulsion and the noise level drops. Jet engines are now 80 percent quieter than they were 60 years ago. However, the cost and technical effort required to achieve further measurable noise protection is constantly increasing.

QUIET IS STILL NOISY

Vortex generators for aircraft, quieter industrial machinery and consumer appliances, silent brakes for trains: thanks to modern noise protection technology, the average maximum noise level has indeed been reduced for many people. However, the effect is not necessarily obvious – after all, urbanization, traffic and the global flow of goods are all on the increase. The battle against noise is far from over. ■

Questions on this topic?
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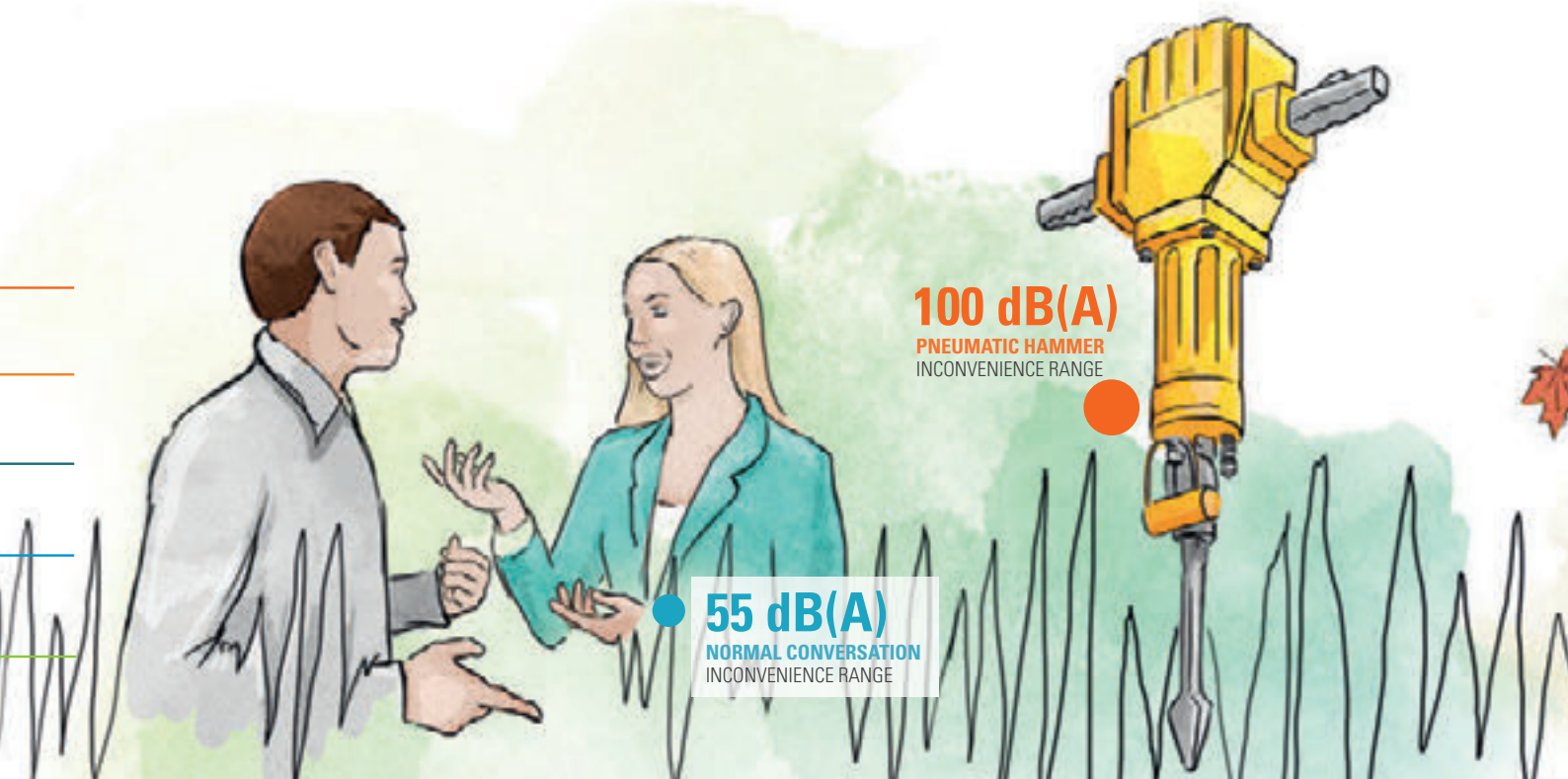


"OUR EARS NEVER SLEEP"

Interview with
Dr. Wiete Schramm
Specialist in occupational medicine and health expert with TÜV Rheinland:
wiete.schramm@de.tuv.com

"Noise is bad for you!"

How does noise damage health?

Noise can harm our hearing directly but it can also affect the body as a whole. Permanent noise at the workplace starting at a level of 85 dB(A) can result in noise-induced hearing loss. Noise can cause irreversible loss of the hair cells in the inner ear and therefore permanent hearing damage, not just at work. But environmental noise – the everyday mixture of traffic, construction noise, ringing phones and barking dogs – is also harmful to health. This constant underlying noise does not damage our hearing directly but causes agitation and stress. It leads to sleep and concentration disorders that are often treated with medication. Ongoing exposure to noise stress can also increase the risk of cardiovascular disease.

Can you get used to noise?

Mentally yes, but not physically. The body always reacts to noise in the same way: it emits stress hormones and the pulse increases. If a person thinks they have got use to noise, they may well be suffering an initial hearing impairment. Even though high levels of noise may not make us feel stressed, they still damage our hearing. Noise-induced hearing loss starts in the high-pitch range. Noise is perceived very subjectively – each individual reacts differently: some are barely bothered by noise or not at all, while others find it annoying. If we want to go to sleep, the buzz of a mosquito can seem deafening. Our ears never sleep.

So noise doesn't have to be loud?

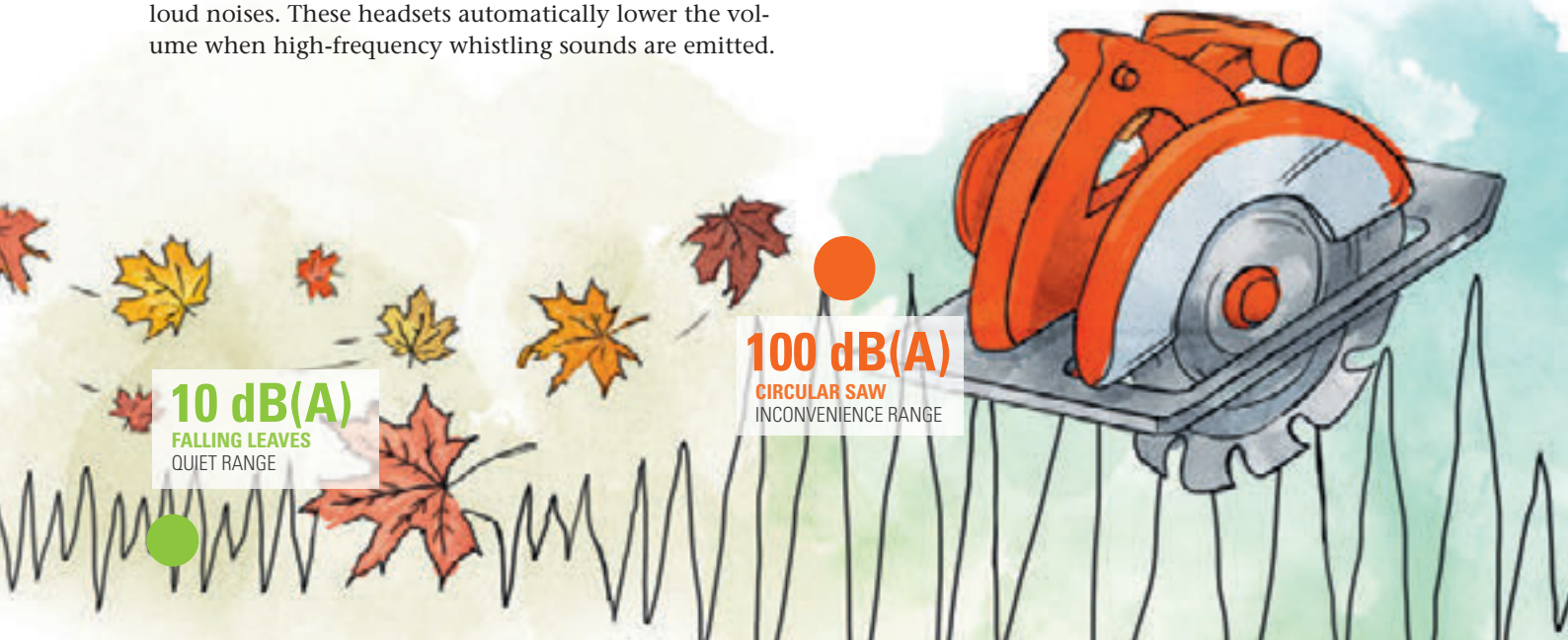
In a train, a quiet telephone call nearby can be more annoying than the loud clatter of the carriage. When other people are talking – in the office, for example – it is especially difficult not to listen and concentrate on work instead. The pitch is also important: high-pitched sounds tend to be unpleasant, like a warning signal. Call center employees are at risk because they are exposed to loud and sudden noises through their headsets throughout the course of a regular working day. Headsets with volume adjustment functions provide protection from excessively loud noises. These headsets automatically lower the volume when high-frequency whistling sounds are emitted.

How can we protect ourselves from noise?

Although noise-induced hearing loss is one of the most frequent occupational diseases, the damaging effect of noise is underestimated because human hearing generally deteriorates gradually and people fail to associate noise exposure with illness. This is why it is so important to observe noise limits and protection regulations. Companies should adhere to the T.O.P rule: priority should be given to technical, organizational and personal occupational safety measures, in that order.

What specific measures should be adopted?

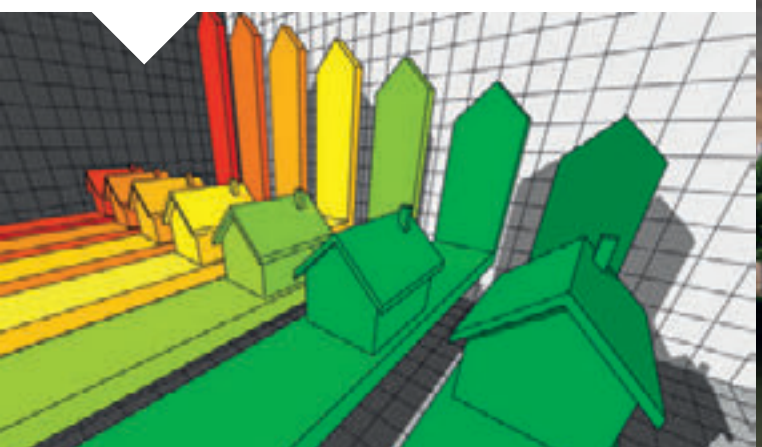
Only machines and appliances should be used that are designed appropriately or acoustically encapsulated so that they operate as quietly as possible. Working areas should also be planned according to noise protection criteria: noise-absorbing carpets, suspended ceilings, shelves and plants help reduce noise levels in large spaces in particular. In open-plan offices it is important to establish quiet areas where people can work without interruption and talk without distracting colleagues. If a workplace is exposed to a permanent noise level of 85 dB(A) or more, however, hearing protection is required, as is regular preventive care by the medical officer.



QUICK NEWS!

A hot autumn for large corporations

Things will start getting busy again at the end of this year – at least for around 50,000 German non-SMEs (small and medium-sized enterprises). By December 5, they must have completed an energy audit to comply with the Energy Service Act (EDL-G). This applies across all sectors – from banks and hotels through to the industrial sector. The new law derives from the European energy efficiency directive and involves a number of new requirements. Companies have to systematically register and analyze the energy consumption of their buildings, procedures and transportation processes with the aim of reducing energy consumption and increasing energy efficiency. They will also be required to have the energy audits repeated every four years by independent experts. According to the EU directive, small and medium-sized companies are not affected by this, nor are those that exercise public administration tasks. Companies which cannot provide evidence of a correctly performed energy audit by the deadline can be held liable to a five-digit fine. TÜV Rheinland offers its customers optimum assistance in introducing this new instrument through independent auditors listed with the Federal Office for Economic Affairs and Export Control (BAFA).
TÜV Rheinland provides fast, flexible support in meeting statutory requirements and establishing expertise in the area of energy efficiency and can also offer information on potential alternatives.



Full steam ahead for a world record

We're world champions – and so is Dusseldorf! And it has absolutely nothing to do with soccer – but renewable energy. Siemens is currently building a gas and steam turbine power station at the Lausward site at Dusseldorf harbor that is set to break three world records when it starts operation next year. TÜV Rheinland is supporting the construction of this record-breaking facility as building supervisor, registered inspection office and notified body. “At 595 megawatts, the power plant will supply the highest electrical output ever generated by a gas and steam block,” says Jörg Hendricks, Business Unit Manager Power Plants with TÜV Rheinland. The “usual” maximum output of a gas and steam turbine power plant is 340 megawatts. The plant's planned net efficiency of more than 61 percent will also be a world record. Generally speaking, the efficiency of such facilities ranges between 50 and 60 percent. And there is another world record the new power plant aims to achieve with its district heating supply: never before has it been possible to extract 300 megawatts (thermally) from a single gas turbine block in a gas-steam power plant. This will increase the total utilization degree of natural gas as a fuel to 85 percent. TÜV Rheinland experts in the areas of building services, ventilation, electrical engineering, fire prevention, gas, water and fuel are contributing their full range of expertise to the plant. “After all, it's not every day we get the chance to feel like world champions,” says Jörg Hendricks. As the registered supervisory body, TÜV Rheinland will give the green light for plant to go into operation – providing all tests go off fault-free and without objections.

Cooperation on land and at sea

Two flagships heading in the same direction: in future TÜV Rheinland will be collaborating with the classification society ClassNK, founded in 1899 in Japan as the Imperial Naval Association for Questions on the Development and Regulation of Shipbuilding and the Maritime Industry. While ClassNK is known as specialist for the certification of maritime equipment, TÜV Rheinland is able to contribute its longstanding expertise on land, for example for wind energy plants. The benefit to customers: in future they will have a single contact partner during the time-consuming and expensive period of testing and certification. The two companies previously collaborated on the certification of wind turbines in 2013. The partnership involved both reciprocal recognition of wind turbine certification as well as mutual support in testing small-scale wind turbines. “We're proud to be working with TÜV Rheinland once again. Its expertise as an independent test provider is appreciated worldwide,” says Koichi Fujiwara, Vice President of ClassNK. In addition to inspections and classifications of ships and offshore structures, the work with ClassNK will also involve quality monitoring, research and damage surveys.

Post-Odile reconstruction work

In September 2014, Hurricane Odile caused serious devastation in Baja California. The damage also extended to several parts of the 100-hectare solar park “Aura Solar 1”. With a rated output of some 30 megawatts, this was the biggest and most cutting-edge photovoltaic power plant in Latin America at the time, having only been in operation for one year. Several companies applied to restore the plant to full serviceability – and the contract was awarded to TÜV Rheinland: Industry service experts for material and non-destructive testing are now supervising reconstruction on site.

CSI Cologne

The owner is in luck – the stolen luxury sedan turns up a few days later. The thieves have removed the expensive multimedia navigation device. But at first sight, there don't appear to be any signs of a break-in. So, was the theft faked? Using state-of-art technology and methods, TÜV Rheinland experts work on behalf of insurance companies and the judiciary authorities to find out whether or how criminals have been able to outsmart automobile security systems. This applies to both mechanical and electronic key components. By examining microscopic traces of abrasion they can even determine if a duplicate was made of the original key. The “CSI Cologne” specialists are able to detect manipulation of the mileage counter, too. According to the police, the mileage is manipulated in one third of all used cars sold in Germany, causing billions of euros of economic damage every year. By taking a manipulation device fitted with a particular software and hooking it up to the standard diagnosis socket, most cars can be reset to any mileage in a matter of 30 seconds. Experts can bring the fraud to light by carrying out a precise check on the vehicle interior and tires and by using special adjustment devices. The mileage is recorded in various storage modules in the vehicle. “If a fraudster changes the mileage but forgets to reset other modules, the fraud becomes obvious,” says Ottmar Schneider, expert with TÜV Rheinland Damage and Valuation GmbH.

Frank Melber, IT security expert at TÜV Rheinland.

Service broadside against hackers

The hacker attack on the Bundestag shows that no institution is safe from cyber attacks. Criminals have long discovered hacking as a lucrative source of business with powerful, well-organized sales. But hackers are not only interested in top-level companies. SMEs are increasingly being targeted by digital burglars due to their specialized know-how. And they have good reason to do so: generally speaking, smaller companies have neither the necessary budget nor the expertise to be able to effectively protect their digital assets from more complex attacks. With TÜV Rheinland's new "APT Defense Service", SMEs can establish effective protection against cyber crime. The service includes sensor-supported testing of network traffic for anomalies, for example. In this way, threats can be registered early on, security incidents can be detected, the relevant countermeasures can be adopted and attacks can be thwarted. Companies no longer have to invest in complex technological solutions themselves and build up their own expertise. Instead they have an effective, low-budget and needs-oriented service at their disposal that ensures they are well protected from complex cyber attacks. TÜV Rheinland is looking to launch its "APT Defense Service" in 2016; initially in Germany and in the long term in the USA and other countries, too. To make hackers' lives that bit more difficult.

Power converters on course

The future of power generation is at sea. This is certainly what the experts at the Federal Maritime and Hydrographic Agency (BSH) believe. There is no doubt that the number of offshore plants is constantly on the increase. And this can potentially be a problem for shipping. In order to guide the ocean giants safely through offshore areas, wind energy plants require special obstacle markings that are visible to ships in all weathers and in particular at night. Daytime markings usually consist of colored signs, while night markings on wind energy plants are placed at a total height of 100 meters upwards and comprise flashing red omnidirectional lights. "Plant operators have to set up an appropriate IT security concept for their converter platforms and have it tested by an approved organization so as to avoid collisions with ships," says Ralph Freude, IT security expert with TÜV Rheinland. Converter platforms convert the alternating current produced at sea to direct current so as to be able to cover the large distances to the land station without loss. On land, the direct current is converted back into alternating current and fed into the power grid. TenneT, one of the leading transmission network providers for power in Europe and active in the Netherlands and Germany, had the security concept of its platform BorWin beta tested by TÜV Rheinland. The test focused mainly on aspects such as risk management methods, IT systems, the provision and management of software updates, responsibilities and emergency planning. The result: all tests passed.

4 brief facts

Web

About one in nine of the German population aged between 16 and 74 of age has never surfed on the Internet. This figure is lower than the EU average, as determined by the Federal Statistical Office based on Eurostat data from the year 2014. In the EU as a whole, one in six people have not yet been online.

10,200

is the total length of New York's road network in kilometers – making it one of the longest in the world. And the city that never sleeps boasts another record-breaking figure: the average time it takes for commuters to get to work is almost two hours.

Green energy in the land of the samba

Brazil is on course for sustainability. The photovoltaic market is growing by about 15 percent every year – energy efficiency is all the new buzzword. But it has to be tested. Since 2014, only certified photovoltaic modules with an energy label can be imported to Brazil. This is stipulated by INMETRO, the Brazilian institute for measurement, standardization and industrial quality. Similar to those for large household appliances, the label indicates the system's efficiency level, which has to meet certain specifications. For the first time, INMETRO has also approved two foreign laboratories. One of them is TÜV Rheinland, the only testing organization whose certificates will be recognized for all three technologies: PV modules, power inverters and solar thermal components. "Logistically it is more straightforward and cost-efficient for our customers to send their modules to one of the TÜV Rheinland laboratories than to export them to Brazil and have them tested there," says Jörg Althaus, expert for PV modules. "We test our customer's modules regularly anyway, so either we can use the same tests or else we test additional modules, which requires very little additional work on our part," says the TÜV Rheinland expert. The tests are carried out based on the performance category of the modules and have to be repeated on an annual basis. Approval in Brazil is additionally simplified by the fact that TÜV Rheinland issues its subsequent test reports in both English and Portuguese.

Star check

They're not actually astronomers, but they certainly know all about stars. At the Daimler sites in Bremen and Etzin, TÜV Rheinland experts subject some 17,000 second-hand cars of the brands Mercedes-Benz and Smart to close inspection every year. The virtually good-as-new cars are generally between three and 18 months old and were previously used as company cars or employee rental vehicles. Before a Mercedes goes on the used car market, it has to undergo a visual and technical valuation. Here the experts compare fittings and accessories with production data, determine the car's market value and document this information in special IT valuation and sales systems. When everything is complete, the existing user is provided with a detailed explanation of the check. The expert's to-do list also includes tire management of the used Mercedes and Smart cars. They ensure seasonal tire changes are carried out on time and organize tire transportation and storage through a logistics company. When the vehicle is returned, they also check whether the rims and tires are original parts and assess their wear and tear. "Daimler has us carry out these detailed checks and we are glad to be able to continue to contribute our expertise over the next five years," says Andreas Blecker, Managing Director of TÜV Rheinland Damage and Valuation GmbH.

Oddity

The big "M" of the fast food restaurant McDonald's appears in yellow all over the world – or so we assume. But one city makes an exception: Paris. Here the "M" shines out above the shops in a resplendent white. Why? The French authorities decided that all signs should be white since this is better suited to the look of the city.

168 is the number of characters contained in the full name of the Thai capital Bangkok. Written out in full, it is: Krung Thep Mahanakhon Amon Rattanakosin Mahinthara Ayuthaya Mahadilok Phop Noppharat Ratchathani Burirom Udomratchaniwet Mahasathan Amon Piman Awatan Sathit Sakkathattiya Witsanukam Prasit.

Facts

LET'S GET THINGS CRYSTAL-CLEAR

When you enter the TÜV Rheinland laboratory in Arnhem, you quickly realize what is being tested here: there is glass wherever you look, in all shapes and sizes. On a surface area of more than 500 square meters, experts run up to 58 different tests on glass products of all different kinds. The construction industry, automobile suppliers, solar module manufacturers, producers of glass containers such as bottles and many other glass processing companies rely on the expertise of the lab in the Netherlands.

Testing areas

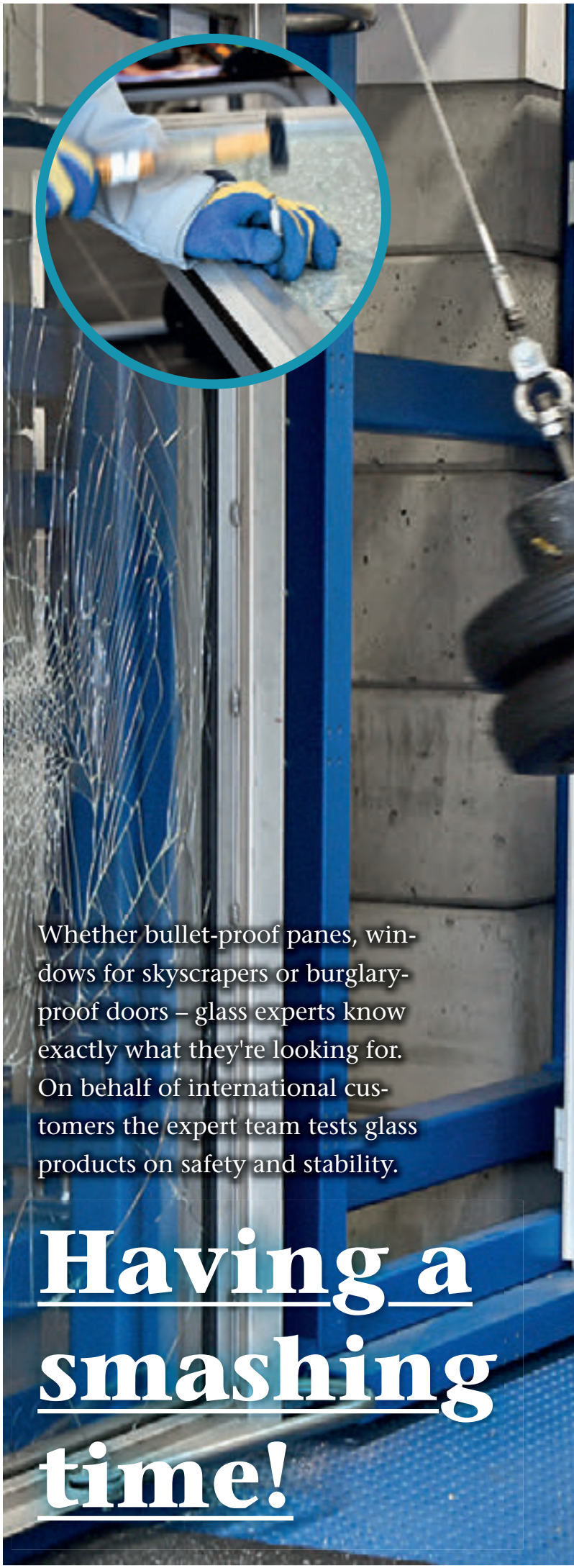
GLASS UNDER THE HAMMER

Glass is a stable material, but it is also very susceptible to breakage. Whether noise protection walls, high-rise windows or car windscreens: poor production and process checks increase the probability of defects – and this can be dangerous when the glass products are put to use. TÜV Rheinland tests glass products for such properties as strength, stability, resilience, sound insulation, compatibility, bendability, radiation tolerance and breakage response. Elaborate testing procedures are applied that involve exposing glass to extreme temperatures and pressures. It is distorted, knocked over by force, dropped and mishandled with sharp objects. In all tests, foremost priority is attached to the safety and stability of the products.

Specials

IN LINE WITH INTERNATIONAL STANDARDS

TÜV Rheinland operates a testing facility that meets international and European standards, including the German DIN norms. Daily, our experts test for instance doors, windows and facades on their burglary-proof security (see picture, right). The lab also carries out structural testing on glass walls and balustrades. Other special services are provided, too: the TÜV Rheinland team offers chemical analyses of glass products and coatings as well as tests on composite glass for motor vehicles.



Whether bullet-proof panes, windows for skyscrapers or burglary-proof doors – glass experts know exactly what they're looking for. On behalf of international customers the expert team tests glass products on safety and stability.

Having a smashing time!

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58 Various tests

... the eight-person strong TÜV Rheinland team runs tests on the most diverse glass products, using a surface area of more than **500 square meters** at a laboratory in the Netherlands.

Transparency at lofty heights: the experts also conduct safety and stability tests on glass designed to take people's weight, for example for balconies.

Careful, something's about to get broken! Too late! But it's all in a day's work here. The glass has to undergo tough testing in Arnhem in order to ensure it can stand up to later wear and tear. The same applies to e.g. doors, which undergo extensive burglar safety testing.

Head in the clouds – Drones approaching

Drones add a touch of inspiration to our everyday lives and are becoming increasingly available to the general public. Their commercial potential is very much under scrutiny, too.

Sssssssssssssst. Attention, attention: unmanned aerial vehicle approaching. Rather like some hovering, over-sized spider, the Octocopter heads for the viaduct in Bielefeld-Schildesche. A small group of people watch from the ground, their gaze fixed on the flying object. By contrast, the Octocopter only has camera eyes for its target. It flies along the pre-stressed concrete bridge in search of cracks, flaking and any spots which are moist or otherwise visually conspicuous. One of the observers holds a monitor in his hands that shows what the drone's sensors detect. Once it has flowed around the arches of the bridge several times, it lands gently in the grass. Great work! Everyone is happy with the results of the trial aerial inspection. It is part of a research and development project being carried out by TÜV Rheinland for the Federal Highway Research Institute (BASt). The aim is to run a feasibility study to demonstrate the potential of drones in detecting and assessing damage on bridges. “We want to find out whether multicopters are a suitable tool for carrying out inspection work on bridges”, says Martin Sperber. “At the same time, TÜV Rheinland Industrial Services

All eyes are fixed on the drone, then shift down onto the monitor: In future, damage to bridges is to be investigated by drones fitted with cameras.

FOR AVIATION ENTHUSIASTS: USEFUL FACTS

1. If a drone is used for sports or leisure, it is classified as a model aircraft, not an unmanned aerial vehicle.
2. Drones are not permitted to enter controlled air space, e.g. near airports.
3. The ideal place to fly a drone is a model airfield or any open field, though the owner's permission is required first.
4. A flying drone must always stay within the pilot's range of vision.
5. Damage caused by model aircraft is generally not covered by personal liability insurance. The relevant insurance cover can be obtained through model aircraft associations, for example.

innovation management is looking at the technical aspects and cost-efficiency of various potential services for such facilities as photovoltaic, biogas and wind power plants." The Head of Division Key Account Aviation/Airports with TÜV Rheinland sees great potential in the deployment of drones.

LOTS OF BENEFITS

Preparatory reconnaissance flights in particular reduce the elaborate abseiling otherwise required of experts. "Once the drone has inspected the structure in question, all surface damage can be clearly documented. This gives the experts a much clearer sense of direction as they go about their work", explains Martin Sperber. At the same time, customers benefit from the fact that the standstill period for bridges and other facilities is reduced to a minimum. "Motorists are pleased to hear that a freeway bridge is not going to be closed for inspection but will be monitored by a drone instead," adds the expert, who was appointed chairman of the UAS standards committee for aviation and aerospace at the German Institute for Standardization (DIN). Here he is involved with issues relating to the standardization of unmanned aviation. This is important in terms of safety and transparency, in relation to both the devices themselves and the services they are designed to provide. It's no easy business. The situation regarding approvals and insurance is in itself beset with uncertainties – not least because different regulations apply from one German state to the next.

GROUNDBREAKING STEPS

While the legal aspects are being examined, TÜV Rheinland is involved in testing the drone systems in use. The focus is on such elements as the so-called flight controller, which is responsible for stable flight mechanics in the multicopter. "There has to be a minimum level of fail-safety for a drone to fly safely," says Martin

315

active drone types were used for commercial purposes in 2014.

Sperber. Other aspects of drone testing include batteries, motors and propellers. Innovation management uses entirely new kinds of measurement sensors. Initial tests at the Fraunhofer Institute for Transportation and Infrastructure Systems indicate that novel sensors can be used to make electroluminescence measurements by daylight. This is a huge advantage, particularly when it comes to inspecting photovoltaic plants. As far as how and in which areas drones can be put to use in the service sector, only the future will tell. One thing is certain, however: they are capable of much more than just taking nice bird's-eye view photographs. ■

Thanks to new sensors, the drone is able to document the state of the bridge to the nearest millimeter.

The monitor shows the data gathered in the aerial inspection in real time.

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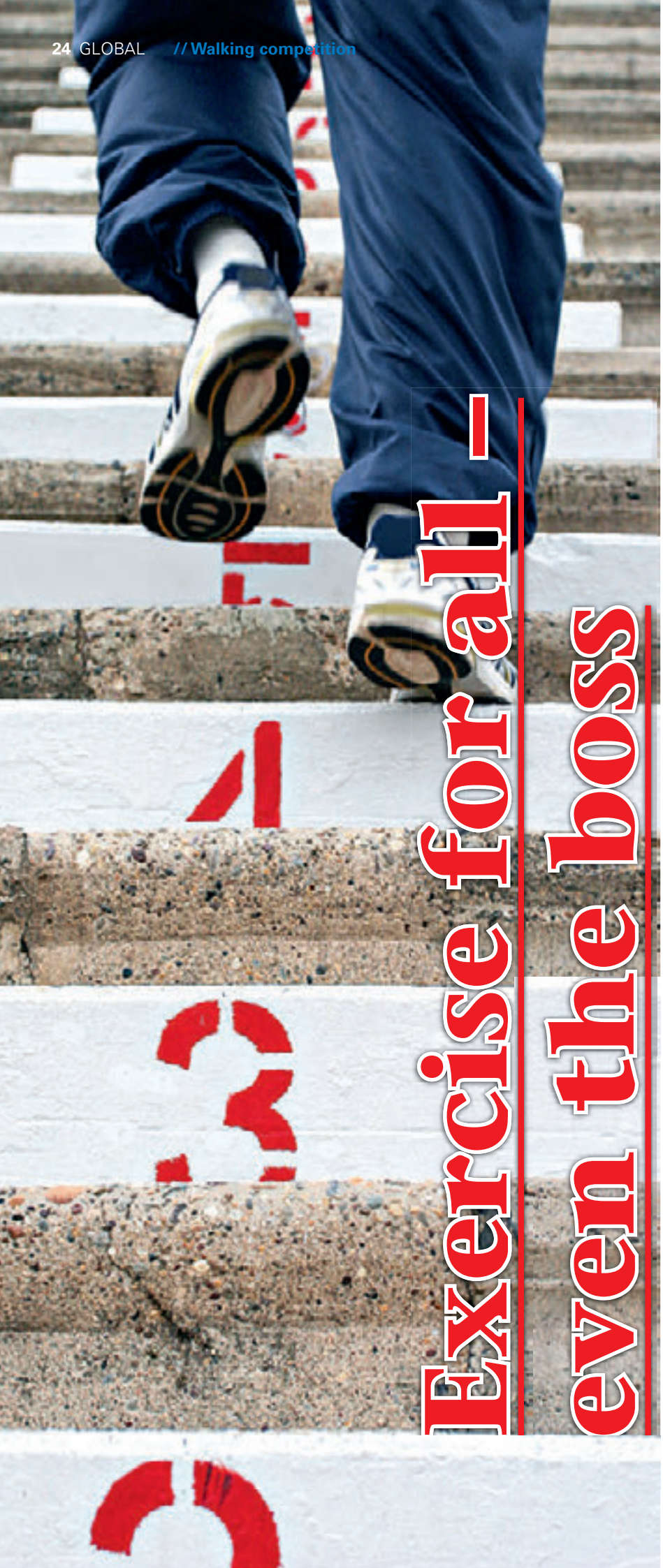


Exercise for all – even the boss

60

days is how long a virtual walking competition lasts as offered by TÜV Rheinland

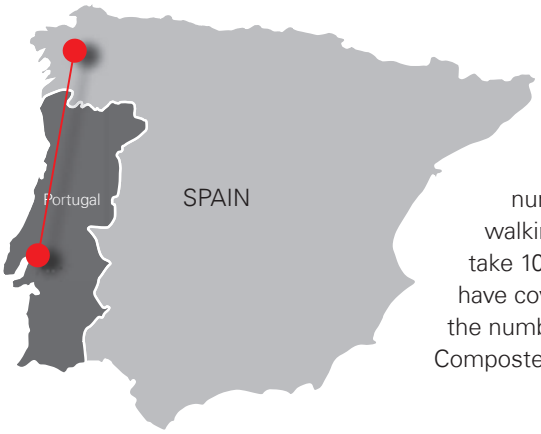
Office workers spend 80,000 hours at desks or conference tables during the course of their lifetime. Virtual company walks get staff moving and therefor create a positive team atmosphere.

On a normal day, two thirds of Europeans spend between 2.5 and 8.5 hours sitting. 42 percent never do any sport at all.* So it's no surprise that people frequently complain about backache and muscle tenseness. When the pain becomes chronic, it costs companies a lot of money: The loss of working hours due to employees suffering chronic backache is what inflicts the greatest damage to the economy. There's only one remedy: plenty of exercise. Studies show that sick leave rates drop in companies where staff regularly engage in sports activities. Many already provide health programs for their employees, offering yoga, Nordic walking or cooperations with fitness centers.

EVERY STEP COUNTS

TÜV Rheinland goes one step further. For some time now, the testing service provider has organized virtual walking competitions – both for its own staff and for companies who wish to get their employees moving. It's very easy to join in: using a step counter that is activated around the clock, participants cover a virtual distance – for example from Santiago de Compostela to Lisbon. Not only individual effort

**Source: European Commission/ Eurobarometer Study 2014*



According to the WHO, 10,000 steps per day are sufficient to promote good health. This is the number of steps on which various walking competitions are based: if you take 10,000 steps per day on 60 days, you have covered a distance that is equivalent to the number of kilometers from Santiago de Compostela to Lisbon.

is required but team spirit, too: the various competitions offer attractive prizes for the walking teams who achieve the highest average number of steps per day. But whatever the result, all participants go home with a sense of achievement. Walkers enter their daily results on a special web page. The page features a dynamic map that shows how much of the distance the walker and his or her team have covered. The map and hot-lists also provide information on how walkers from other companies are doing by comparison. Generally speaking, a virtual walking competition lasts 60 days. Other sports activities can also be converted into steps. For example, 30 minutes of cycling is equivalent to 3,900 steps, while 30 minutes of swimming is converted to 4,500 steps.

NEW APPOINTMENT IN EARLY 2016

Experience indicates that even wearing a step counter can motivate participants to get more exercise. They go out even in bad weather, use stairs rather than lifts, leave the car in the garage if they're not going far or speak to a colleague in person rather than picking up the phone. In addition, virtual walking competitions strengthen the sense of community in a company, thereby improving the working atmosphere and providing a source of day-to-day motivation. And both externally and internally, companies themselves are seen to be making a proactive effort to support the health of their staff. For spring 2016, TÜV Rheinland is once again looking for companies in the region of northern Germany who wish to promote staff fitness by means of virtual company walks.

In future, the testing service provider's website will provide participants with a wide range of information going beyond the competition itself: in addition to the current status of the contest, a BMI calculator and a diet check, you will find out lots of useful facts on the subject of health, diet and fitness such as: How can I find the right walking shoes? or: What can I do to stay healthy throughout the winter? ■

For further details of walking competitions, see: www.tuv.com/tappa.

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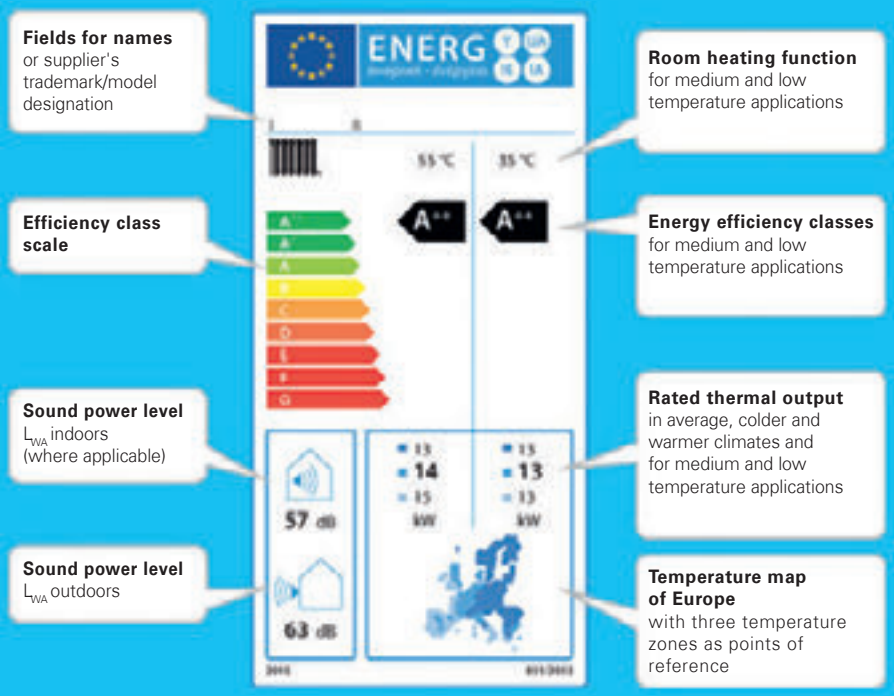
Simply get walking: a step counter contains either a small metal ball or a mercury bubble. This can move freely within certain limits. Every movement of the body is passed on to the step counter and the metal ball or mercury bubble moves too. The pedometer registers this impulse electronically and interprets the movement of the ball as a step to be counted by the system.

In the area of heating pumps, boilers, thermal power stations and the like, five mobile stations ensure that such appliances are in for a colorful future.

The European Parliament has spoken: from now on labels are required for all heating units and water heaters. As of September such appliances also have to bear the color-coded energy efficiency markings. TÜV Rheinland carries out the necessary tests with a unique set-up of mobile facilities.



Heating units and water heaters now require energy labels that instantly reveal their capabilities.

+80
degrees Celsius
can be simulated at the Cologne laboratory.

Colorful eco design

There's no hiding for heating appliances and water heaters from now on: as of September, the Energy-using Products (EuP) Directive has come into force for the heating industry, also known as the Ecodesign Directive. It requires all such devices to bear an energy label showing their efficiency class and energy consumption level. The colored labels have already become a familiar sight on TV sets, washing machines and refrigerators. From now on they will also provide guidance for consumers when they wish to buy a new household heater or water heater. Oil and electricity-powered heating units will also go regularly to the TÜV Rheinland lab for testing. "In future the labels will be binding for stoves and wood pellet burners, too. Our timber depots are full – we are well prepared for the test series," explains Reiner Verbert, energy expert with TÜV Rheinland.

MOBILE AND VERSATILE LAB FACILITIES

The lab is equipped with five mobile test stations. Reiner Verbert and his 13-strong team are able to simulate the daily hot water requirements of an average household, as well as the use of brine-to-water and water-to-water heat pumps. A thermotechnical test bench runs fully automated tests to measure the efficiency of heat pumps, boilers and thermal power stations. The lab also features its own climate chamber to test the energy efficiency of air-to-water and domestic hot water pumps. If necessary it is possible to simulate temperatures of -15 to +80 degrees Celsius and an air humidity level of up to 95 percent – so the test lab can cover the entire climatic diversity of Europe.

ONE STEP AHEAD

When it comes to gas-burning appliances, the Cologne laboratory is always one step ahead of the directives. Since manufacturers sell their condensing boilers in various European countries, the lab has to be able to meet international requirements. "Every country has its own gas mixture, and so the contents of the cylinders vary," says Reiner Verbert. In France there is a higher connection pressure, Sweden has a different family of gases and Romania uses butane rather than propane. These differences are vital for the work done at the Energy and Environment Test Laboratory. TÜV Rheinland experts always have samples of the varying national gas qualities in store – neatly symbolizing European unity and diversity: here there is perfect harmony between France and Poland, Belgium and Sweden, Hungary and Denmark. The manufacturers actually create the energy labels for their appliances themselves. TÜV Rheinland verifies the specifications and issues a certificate, providing the tests confirm that these are correct. "We regard ourselves as a partner to both manufacturers and consumers alike," says the TÜV Rheinland expert. ■

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The new ID numbers are as unique as a human fingerprint.

Completely individual

As of 2016, only individual test mark numbers will be issued by TÜV Rheinland for products. This is good for consumers since the new transparency means easier purchase choices. Companies stand to benefit too – if they make the most of the opportunities the change offers them.

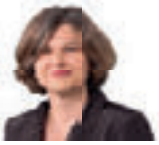
They're easy to miss if you don't look closely: the ten small figures on the TÜV Rheinland test mark. Although they're barely noticeable, they actually have a key role to play in terms of transparency, customer communication and anti-counterfeiting. Every test mark bears such an identification number (ID). It allows the user to access information on the relevant test through TÜV Rheinland's certificate database Certipedia (www.certipedia.com). A test ID can be either generic or individual. Generic IDs refer to general information on the certificate but without any link to the product tested. A familiar example is the one-billion ID 1000000000, which is reserved for the GS mark (*Geprüfte Sicherheit* – tested safety). An individual ID is linked directly to the product tested. The Certipedia website provides a description of the testing method, product photos, an overview of other certificates, company contact details and a link to the company website, for example.

PURCHASE DECISION? NOTHING COULD BE SIMPLER!

The existence of different types of ID will soon be a thing of the past: as of 2016, TÜV Rheinland will only be issuing individual test mark IDs. In this way, the company continues to pursue the strategy it adopted with the introduction of its new uniform test mark in 2013. The motto is increased clarity and transparency – both for companies and end consumers. “We want to provide a clearer picture of the range of tests that a test mark denotes,” explains Professor Ralf Wilde, Head of Product Division. “The information is to be easily accessible for everyone and clearly comprehensible.” The decision to issue only individual test numbers also has to do with changes in the legal situation. The Higher Regional Court in Düsseldorf passed a verdict that a test mark has to indicate where more precise information can be found, including the specific testing criteria. This applies to all test marks a company uses for promotional purposes vis-à-vis end consumers. The aim is to prevent TÜV test marks being used to promote products without showing details of what exactly was tested, for example. The test mark may refer to many different things such as the company's quality management system, the functionality or the safety of the product. With the introduction of the new test mark, TÜV Rheinland has developed its own consumer-friendly solution to prevent misunderstandings: keywords supplement the test mark, showing the features tested and therefore creating greater transparency. This is also what the court is seeking to achieve with its requirements. “All this means that the TÜV Rheinland test marks will look different. In future, the focus will be on the entire range of services provided by TÜV Rheinland, going far beyond the aspects of safety and quality of the relevant products; and it will be easier for consumers to access this information,” explains Professor Wilde.

WELL PREPARED FOR THE FUTURE

For the practical implementation of the court's verdict, companies benefit from a testing services provider that provides the information required directly in its certificate database. So the powers that be at TÜV Rheinland have no worries about the future. After all, Certipedia already allows for the individual ID check as required. The Higher Regional Court in Düsseldorf has confirmed that the combination of the ID and the Certipedia platform is a suitable reference specification. And market research shows that people do actually use Certipedia: "When a product is advertised with the TÜV Rheinland test mark and the relevant QR code, there is a huge increase in access to the Certipedia website," says TÜV Rheinland Marketing Manager Gabi Kimura. One in ten views now come from mobile end devices – and the trend is on the increase. TÜV Rheinland will continue to improve the user-friendliness of the database. "Some companies fear all this will involve more work", says Gabi Kimura. "So we're trying to show them that the changeover actually offers great opportunities. The improved transparency is perfect for customer communication – after all, each individual ID provides detailed information on the product." ■



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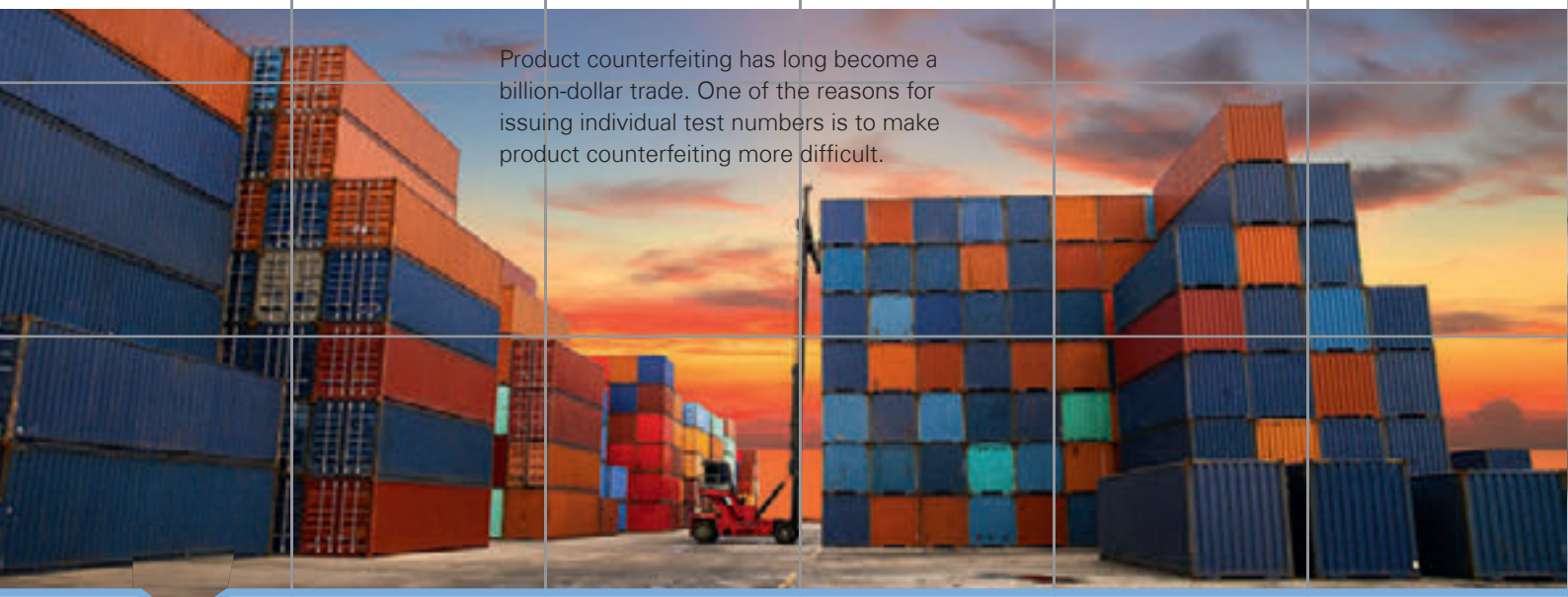
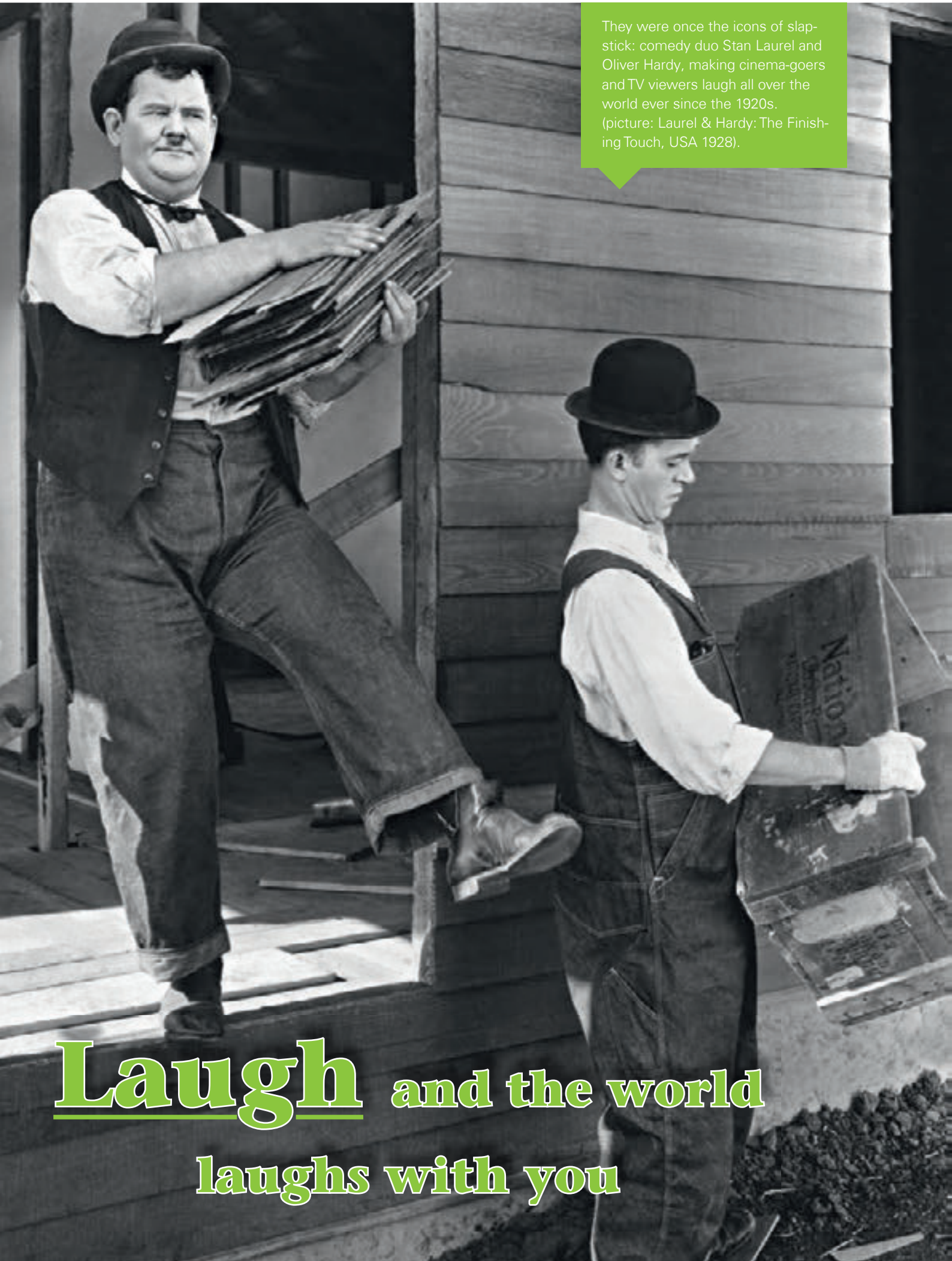


Product counterfeiting has long become a billion-dollar trade. One of the reasons for issuing individual test numbers is to make product counterfeiting more difficult.

CERTIPEDIA? WHAT IS IT CAPABLE OF?

Certipedia is TÜV Rheinland's certificate database. It contains all products, services and systems tested, certified and monitored by TÜV Rheinland worldwide. Certipedia has existed in its current form ever since the introduction of the new test mark in 2013. An individual Certipedia page is reserved exclusively for the tested product or – in the case of management certifications – for the tested company. It is accessed by entering the ten-digit test ID or by scanning the QR code on the test mark. The page shows all standards according to which tests were carried out, as well as containing product photos a link to the company with contact details. So the individual page not only provides key facts on the tests conducted but is also ideal for companies as a means of customer communication. The certificate database is currently being updated with consumer-friendly texts and a slightly altered structure. In this way, TÜV Rheinland is readying the database for the changeover to individual test IDs only from 2016 onwards.

Don't be taken for a ride: thanks to individual IDs, consumers will have access to detailed information on any tested product as of 2016. Was this net swing tested for pollutants? Or was the structure of the swing tested? These questions and others like it are answered by the individual ID.



They were once the icons of slapstick: comedy duo Stan Laurel and Oliver Hardy, making cinema-goers and TV viewers laugh all over the world ever since the 1920s. (picture: Laurel & Hardy: The Finishing Touch, USA 1928).

Laugh and the world laughs with you

"Humor is the button that stops us from blowing our tops," was what German author Joachim Ringelnatz once said. But humor is much more than just a valve to let off steam. It can be a powerful aid for communication.

*Source: MedizinAuskunft

Darkness. A monstrous figure appears and gives the command: "Go". A dog disguised as a spider sets off to scare unsuspecting pedestrians. The video "Mutant Giant Spider Dog" is a hit on YouTube with more than 148 million clicks. The community is definitely amused. If it doesn't make you smile: don't worry. That doesn't mean you don't have a sense of humor. Dry, black, coarse or very British – humor comes in many a shape and form. And everybody finds different things funny, whether a corny joke, self-irony, slapstick or amusement at someone else's misfortune (the so called German *Schadenfreude*). Science finds this so interesting that humor has been subject of serious research for thirty years – and that's no joke! Humor researchers – also known as gelotologists (from the Greek *gélio* – laughter) – assume that everyone is born with a sense of humor. But laughter is a phenomenon that is closely linked to cultural, social and personal factors. So from the scientific point of view, humor varies from one country to the next.

DIFFERENT COUNTRIES, DIFFERENT JOKES

Germans are said to be rather discreet in their humor, while Americans like to laugh out loud and rather over the top. The Irish are also said to have rather a coarse and quickly erupting sense of humor. By contrast, people in China and Japan like to smile but laughing out loud is not something they do in public, let alone in working life. Spaniards like to joke about themselves, providing there is no personal offense. The Swiss prefer a more subtle type of humor, while the French like hidden humor that is hinted at rather than put across with a sledge hammer. Australians and New Zealanders particularly enjoy witty puns. And the British are well known for their dry humor with a good dose of cynicism. It is open to debate as to how much of this can be scientifically proven and how much is ultimately just a cliché. But one thing is certain: when people tell jokes on the same humor wavelength, it provides a fertile basis for successful communication – at the workplace, too.

EVERYTHING IS EASIER WITH A SENSE OF HUMOR

Humor is a wonderful thing. It can bring people together, for example. After all, people who laugh together get on well and share the same values. This makes it easier for them to collaborate and creates a sense of team spirit. Insider jokes also strengthen group identity. But humor is a psychological defense strategy, too. It creates distance. Strenuous customers, an irritating boss or bad mood due to additional overtime can be much more bearable with a dash of black humor. It brings down stress levels. Humor can also lift people's spirits generally. A little joke is a great way to get a conversation going, for example. It can also relax the atmosphere before going into a meeting about serious matters. Humor can help resolve conflicts, too. It can be used to express your own opinion without confronting the other person directly. With a little humor it is also possible to test a colleague's attitude when you're not sure. If their reaction to a suggestion is not as hoped, you can save the situation by saying: "It was just a joke". However, you should be careful about who you joke with and at what level. Otherwise an intended joke can soon backfire. And as we all know, he who laughs last laughs longest – and that's not generally the person who faces severe trouble with his superior. According to research, humor not only facilitates communication. It also increases our sense of self-satisfaction and even makes us more attractive and imaginative. If we are able to see the world from the funny side now and again – in spite of the serious matters in everyday life – it can help us relax. It reduces annoyance and pain, stimulates the immune system and strengthens our mental defenses. No wonder laughter is the best medicine. On this note: stay cheerful! ■

Operators can only meet the increasing data needs of their users by boosting the capacity of their mobile networks.

Calling: the past. Data: now.

For many people, mobile communication is all about the good old mobile phone. But nowadays operators are having to handle huge data streams – and they are boosting their network capacity to be able to cope.

Whether streaming YouTube videos, uploading photos on social networks or using e-health apps to send vital signs data to an attending physician: smartphones are the point of access to an entire world of mobile digital services. And users' appetite for data appears to be insatiable. In the next three years alone mobile data transmission in Germany will increase by more than ten times, estimates Gunnar Franke, ICT expert with TÜV Rheinland and responsible for network planning and services.

NO MORE DATA LAG

The increasing demand for even greater data volumes is not only coming from smartphone users. Vehicle networking on Germany's roads to transmit traffic congestion and accident data is only possible if there is a stable mobile connection in place. Digitally networked services and devices require huge data streams and low latency (delay in data transmission). These can only be achieved by the most cutting-edge, high-performance mobile communication networks and standards, such as LTE and LTE Advanced (also known as 4G).

SMALL CELLS FOR A LOT OF PEOPLE

"The Digital Agenda can only be achieved in Germany in collaboration with the mobile network companies. After all, they are responsible for one of the fundamental requirements when it comes to using the so-called Internet of Things: digital infrastructures", says Gunnar Franke. Even if the self-driving car or the digital doctor are likely to remain visions of the future for a while yet, the demands of data transmission are definitely increasing – cars will stream music from the cloud, offer remote control auxiliary heater activation or exchange technical

data with their manufacturer. So network operators are having to work flat out as they face the challenge of consolidating their existing infrastructures, expanding capacity and closing any service gaps. After all, services and devices cannot simply cease to function simply because users find themselves in a dead zone. This is why operators are under constant pressure to expand. “Mobile network companies are having to upgrade their station technology with increasing frequency and set up new facilities faster and faster,” says Franke, speaking from his own consultation experience. One current trend in creating additional capacity is the so-called small cells technology. Here, operators set up small radio access nodes (so-called microcells, picocells and femtocells) in places where large numbers of people are clustered simultaneously – such as in conurbation areas. “This will become increasingly important in the years to come so to expand the capacity of mobile networks”, says Franke. The benefits: the technical effort required to set up the cell is relatively low, and the small cells can be hooked up to an existing internet connection fairly economically. In order to ensure ultra-fast mobile data coverage, the larger stations also have to be upgraded to broadband with either glass fiber or directional radio. For example, the mobile communication standard LTE Advanced provides users within the radio cell with high bandwidths of more than 50 Mbit/s. Precisely this type of bandwidth is required in order to be able to use the digital services of the future. Operators have already gained additional network capacity with the frequency auction of Digital Dividend 2 in the frequency band around 700 MHz. But as the regulatory authority responsible, Germany's Federal Network Agency has also imposed the requirement of using this to provide broadband coverage along motorways and ICE rail routes. How can network operators prepare for the constantly increasing call for larger data volumes? Franke and his Network Planning team are currently working on potential solutions. After all, there is a huge demand: all mobile network operators will have to continue to invest heavily in expansion in the years to come. The interconnected world is coming and the infrastructural foundations for it have to be laid. The advantage here: all those involved stand to benefit from the new business potential – not just the mobile network operators themselves. ■

CONNECTING THE WORLD

Although mobile networks for high speed Internet have to be further developed and expanded, Germany is well advanced by international standards in terms of high-speed mobile Internet. The picture is very different in many parts of the world – in fact two thirds of the world's population has no Internet access at all. This is why tech giants Google and Facebook have made worldwide mobile network development a top priority. Regardless of what own interests companies may be pursuing – the ideas are certainly fascinating. For some time now, Google has been testing balloons that fly around the world at an altitude of around 20 kilometers, providing Internet access within a radius of some 40 kilometers by means of LTE technology. Meanwhile Facebook uses a system that comprises solar-powered drones, satellites and lasers.
For further details see www.google.com/loon and www.internet.org

Live reporters everywhere: at large-scale events, mobile networks quickly reach their limits, so operators are working flat out to expand capacity.

Questions on this topic?
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Approximately **95,000** **tuning fans** are signed up on the Facebook page leg.mich.tiefer.

The master tuner

Sidney Hoffmann is a tuning expert, TV presenter and a true professional when it comes to turning a run-of-the-mill second-hand car into a real gem. And he always adds his own personal touch of course.

Mr. Hoffmann, you financed your degree in mechanical engineering by repairing vehicles with accident damage. Did you find out about tuning simply by "pimping" cars a bit?
Yes, during my repair phase I had a lot of ideas, especially in the area of tuning. And cars are easier to sell if they are more attractive.

Your TV career as a tuning expert started with "PS-Profi" on Sport1 in 2009. Your first car was a Golf II. What were the various changes you made to it?
Oh yes, my beloved Golf II. It gave up its existence as a serial production vehicle fairly quickly. It was my guinea pig for everything from paint finishes to tuning attempts. I tried out an awful lot on it. By the time I was finished with it, it was using up more oil than petrol. That's what I call learning by doing.

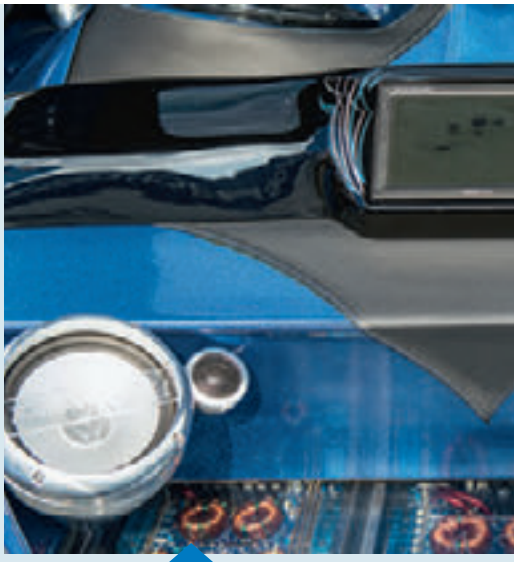
How would you describe your special "Sidney" style that has been so successful?
That's difficult to answer. You'd have to ask the viewers. I think the success derives from the fact that you keep your feet on the ground, stay true to yourself and don't take your TV career too seriously. Don't get me wrong, but it should never get to the stage where you don't enjoy what you're doing any more.

What do you do if you can't find your TV customer's dream car or the budget is insufficient to carry out the tuning required? Have you ever been off target?
That does happen, of course. Tastes vary as we all know. It can happen that it you get it wrong, though our off-target rate is in single figures. The German automobile market is so big that generally speaking you can always find someone's dream car.

What should potential second-hand car buyers look out for in particular so as to avoid a rough ride?
It's a good idea to go for a vehicle with a full service history. If not, be sure to look over the car three or four times so as not to miss out on anything. The main thing is: you should be sure to have a positive impression of the seller.

There were a total of 600 unique automobiles on show at the 2015 Tuning Night in Cologne. Sidney Hoffmann compèred the event for the second time. His opinion: "TÜV Rheinland Tuning Night with Sidney Hoffmann – it's a perfect match!"

Last year's winner at the Cologne Tuning Night, Marco Müller (right), the former Miss Tuning, Leonie Hagmeyer-Reyinger alias Leo Theresa and Sidney Hoffmann, the man who has supergrade fuel flowing in his veins.



In addition to visual highlights, inveterate car tuners also like to make changes to the sound of a car. Car hi-fi adaptations often involve the speakers and amp ending up in the trunk.

Which dream cars haven't yet made it to your garage?
A VW T1 Samba bus and a Porsche 964 Turbo 3.6.

In your Dortmund-based turning company Sidney Industries you also offer spectacular cars and bikes in "apocalypse" style. What exactly does that mean? And what is your latest "toy" after the foil-covered Golf GTD in military Transall aircraft design?
We try to avoid the mainstream by tuning cars in a distinctive style and adding an imaginative touch to standard tuning. My latest "toy" is the Porsche Turbo with Japanese extensions. Of course I'm still very much involved with the compact car segment too and enjoy messing around with a Beetle Convertible.

What do you think of the so-called rat lookers – automobile "rats" that are currently causing a sensation in the tuning scene?
I think the rat look is very cool. It had its heyday in the scene once before but has now seeing something of a revival with an altered style.

One of your most unusual projects is the extremely low-slung cult 1976 T2 bus with a surfer-style interior. How did you hit upon this idea?
No idea. I've loved VW buses since I was a little kid. So it was logical that a project like this would come my way sooner or later. I realized that the conversion was going to be different – flexed look, Subaru engine – it wouldn't have worked in the T1, the first-generation VW bus with the split windscreen. So it was a T2 with the big windscreen. On projects like this I like to let my imagination run free andtry to do everything as best I can, but always in an unusual style. As far as the surfer look is concerned: high-end wood such as rosewood, modernized with technology such as an LED television, a Playstation and entertainment elements.

TÜV Rheinland also focuses on the fun factor in addition to road safety, of course. But where are the limits to pure fun as far as you're concerned? When can things actually pose a risk to life and limb?
Professional tuning is not just about cool looks and loud sounds: more than anything it's about safety. Looking at cars can often put you off tuning altogether because people fail to take account of the safety aspect. Many customers simply don't understand this when we're advising them. Every conversion simply has to be technically uncritical and guarantee full functionality of the car. It's certainly no joke when people make false economies, failing to invest sufficiently in the brakes and suspension etc.

What does a guy with a passion for cars do in his free time? Do you simply shift down a gear and enjoy the tranquility of nature for example?
In my free time – when I'm lucky enough to get any – I make the most of time with my close friends and family and enjoy the sounds of nature.

TÜV Rheinland Tuning Night offers a great platform for tuning fans to talk to experts about tuning and safety. Expert consultation is available directly on site.

"Automobile rats" are very much the in thing. Yvette Hentzschel loves the rusty, rancid "rat look" of her Golf, too. "The car's supposed to look as if it'd been standing around outside for years," she says.

Editorial Information

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January 27 – February 1
Toy Fair, Nuremberg, Germany

January 28
Renewable UK Health & Safety, Birmingham, England

February 1 – 3
India International Leather Fair, Chennai, India

February 9 – 11
MedTechWorld West, Anaheim, USA

February 13 – 16
Toy Fair, New York, USA

February 16 – 18
E-World & Water, Essen, Germany

March 13 – 18
Light & Building, Frankfurt, Germany

April 6 – 9
Taiwan International Electric Vehicle Show, Taipei, China

April 10 – 13
Global Congress on Process Safety, Houston, USA

April 17 – 20
China International Medical Equipment Fair, Shanghai, China

April 25 – 29
Hannover Messe, Hannover, Germany

May 17 – 20
Hospitalar, Sao Paulo

May 23 – 25
SNEC PV Power Expo, Shanghai, China

June 21 – 23
Power Gen Europe, Milan, Italy

June 22 – 24
Intersolar, Munich, Germany

July 18 – 21
Eletrolar, Sao Paulo, Brazil