

DOOR LAB

MAGAZINE  THE FUTURE OF DOOR SYSTEMS

ISSUE 2 / 2014



Focus: **FIRE PROTECTION AND ESCAPE ROUTES**

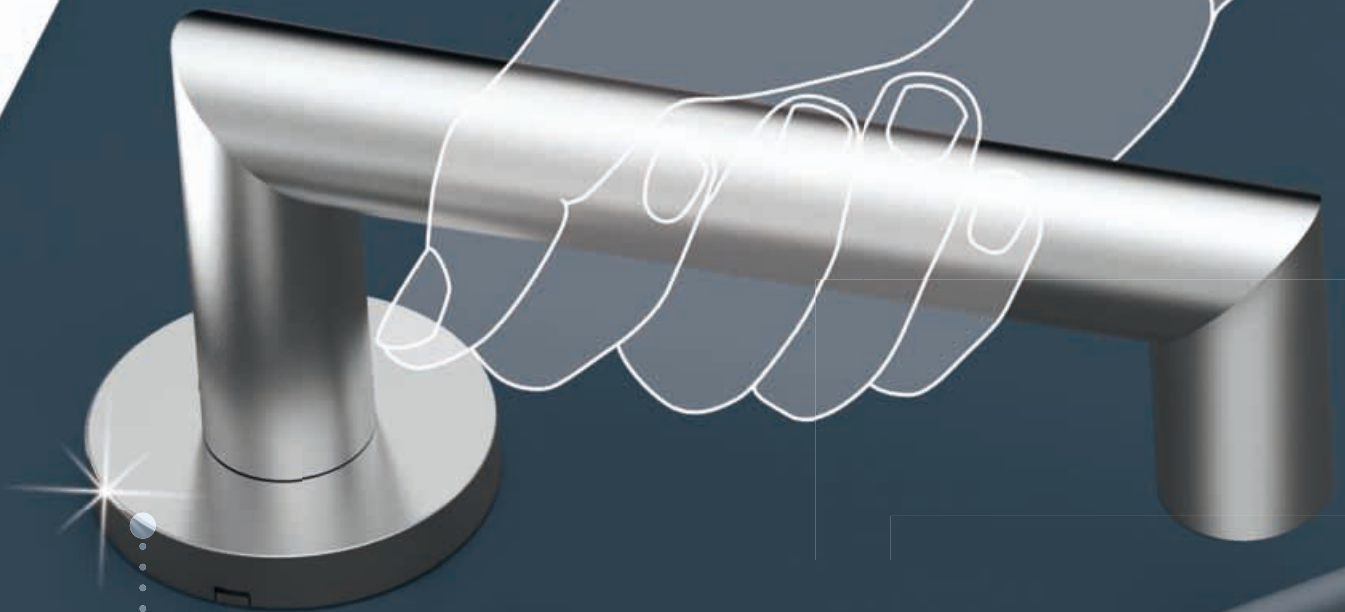
Essay: **THE ORIGIN OF NORMS AND STANDARDS**

In practice: **COMPLEX DOOR SYSTEMS**



ECO OKL Magis

Designed for handling



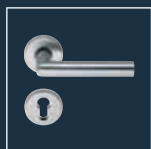
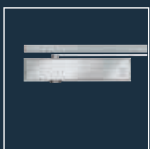
Brilliantly defined radii: the new, innovative ECO OKL Magis ball bearing technology

- EN 1906, Usage category 4
- DIN 18273 approved for fire and smoke protection doors
- Corrosion class 5
- Fixed sleeve nuts
- EN 179 depending on latch model
- Grooved ball bearing unit
- Flexible bearing
- Carrier 90° swing
- Return springs
- 2 million test cycles

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■ SYSTEM TECHNOLOGY FOR THE DOOR



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WE LOVE DOORS!

Around 200,000 fires are recorded each year in Germany alone, causing the loss of around 400 lives. This is a huge number that cannot be ignored, and private homes are just as badly affected as public buildings such as hospitals or care homes. Smoke detectors are an essential preventative measure but doors also play a major role in saving lives in the event of a fire. Their function is to enable people to escape outside and allow access for firefighters. Yet the door is a complex system: it consists of various components that need to work in perfect harmony to ensure that even in an emergency and under extreme pressure they can still fulfil their life-saving remit.

This is where we come into our own. Our passion for doors has always been driven by the concept of making doors as safe and functional as possible. We view them as a holistic system that is only ever as good as its weakest element. For that reason the new issue of our "Doorlab" magazine is focussing on fire protection and escape routes, as well as other topics of interest. "Doorlab" is, as the name suggests, a forum for investigating all issues concerning door systems as well as acting as a platform for ideas, suggestions, criticism and discussion. Everyone who is as passionate about doors as we are can have their say here: our partners in the door manufacturing industry, associations, architects, designers, technical experts, historians and



▲ The next generation of the Schulte family has taken over at ECO: Heinz Schulte, Tobias Schulte and Andrea Widmann.

philosophers as well as the end users. Here there is room for an interdisciplinary exchange of opinions and constructive food for thought that can influence the future development of door systems.

We invite you to take part in this dialogue and to be infected by our passion for doors! After all, good ideas and innovations are always born out of passion.

We hope you enjoy the read.

Heinz Schulte

Andrea Widmann

Tobias Schulte



Doorlab magazine is also available as a digital issue for free download from the iTunes Store or at:

www.eco-schulte.de/doorlab

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THE ORIGIN OF EUROPEAN NORMS AND STANDARDS

HOW EMPEROR NERO STANDARDISED FIRE PROTECTION

The destructive power of fire has always filled mankind with fear and terror. And with good reason, as in earlier times major fires were among the worst calamities that could affect towns and villages. Often an overturned candle or a fallen ember from an open fireplace was enough to set off a blaze that could destroy an entire settlement. Since time immemorial man has been relying on the protection of binding building regulations, which have developed into the norms and standards in place today. >



< Emperor Nero was unfairly accused of fiddling while Rome burned. In fact, he revolutionised fire protection. Photo: Wikipedia/Bibi Saint-Pol

One of the most famous examples of a devastating city fire was the Great Fire of Rome in the reign of Emperor Nero in July 64 A.D., which destroyed a large part of the ancient city. Over the course of six days and seven nights, 11 out of 14 districts of the city of 1.2 million inhabitants were partially or completely obliterated, and around half a million people were left homeless, and thousands dead. In contrast to the widespread myth that Nero authorised the blaze so that he could build a new, more splendid Rome, modern historians are to a large extent united in believing that the controversial Emperor had nothing to do with this catastrophe. As far as can be ascertained, it was simply the result of a commonplace accident.

However, when reconstruction of the city began, Nero took a relatively modern approach and imposed an early form of building regulations, which were designed to prevent or at least hinder future catastrophic conflagrations and make it easier for people to escape. Since the rapid spread of the flames was aided and abetted by tightly packed wooden houses and huts, and firefighters and fleeing people obstructed each other's progress, the streets of Rome were now obliged to be of a certain width and were laid out according to an exact plan. In addition, the height of the houses was limited to 25 metres, porticos, inner courtyards and individual enclosing walls were declared to be the standard construction and fireproof stone had to be used for the ground floor of the building. Supervisors were appointed to monitor the public water pipes and every homeowner had to have their own extinguishing agent at the ready. It's no coincidence that our word "norm" has its origin in the Latin term "norma," meaning "rule".

The Triangle Shirtwaist Company fire

A catastrophic fire in more recent times, which led to new laws and standards in escape route planning and fire protection, was the Triangle Shirtwaist Company fire, which killed 146 workers in a shirt production factory in New York on 25th March 1911, all because the doors were locked. The disaster was probably triggered by

a carelessly discarded cigarette butt, which set fire to the highly flammable fabric remnants that covered the floor. The Triangle Shirt Company was housed in the top three floors of the ten-storey, brick-built "Asch" building, constructed in 1901. The building complied with the fire protection regulations of the time, and had two stairwells, a lift and a narrow fire escape on the outside. But the large number of deaths from the smoke and the flames was due to the fact that there were no sprinkler systems installed in the production rooms for reasons of cost, fire drills were not held, and the door to the second stairwell was locked, as the property owners Max Blanck and Isaac Harris wanted to prevent burglaries – even though several small fires had already broken out on the premises. In addition, the fire ladder broke under the



▲ The catastrophe of the Triangle Shirtwaist fire caused a huge stir in the USA. Photo: Library of Congress.

weight of the escaping people and the aerial ladders of the fire brigade only reached to the sixth floor. In just 18 minutes after the outbreak of the fire, all three floors occupied by the company were burnt out.

Shortly after the inferno, the city of New York issued a large number of regulations governing fire protection, health and safety at work and building specifications, with severe penalties for non-compliance. In addition, a national Fire Protection Commission was set up and workers' rights were reinforced. Other cities in the USA followed the example of New York. In Germany too the requirements of fire protection doors were originally defined through building regulations. The first version of DIN 4102 was published in August 1934.

Norms and standards define safety

Then as now, the main aim was to ensure that the rules and regulations would serve to protect human life and property by establishing certain minimum standards. Naturally, human life has top priority and comes before the protection of the property. Wherever human life may be put at risk, a high level of safety must be guaranteed. Nowadays, door systems play a special role in fire and smoke protection, as their technology makes it possible to open a door in an emergency and either to allow people to escape from the danger zone or to isolate different sections of fire. "A door closing mechanism, for example, must never fail under any circumstances, as that could cost human life," explained Heinz Schulte, one of the Managing Directors of ECO, the door system specialists. "That is why we ensure that our closing mechanisms are perfectly synchronised with our other handle components. Safety standards can be best implemented within a complete system." In fact, the closing mechanism of a door system is a highly sophisticated mechanical task for the spring-loaded hydraulic door closers and requires robust and reliable technical compo-



▲ Members of the New York fire brigade on the way to the burning Asch building and involved in rescue work in front of the edifice. Unfortunately the aerial ladders were too short for the ten-story building: they only reached to the sixth floor. Photos: Library of Congress.

ponents of an equal quality that fit any door leaf. "Imagine a situation in which a young vandal hangs on a door leaf," explained Heinz Schulte. "There's 150 kilos hanging on a couple of hinges that need to save lives in an emergency." If the hinges do not stand up to this kind of stress, it will undermine the precise choreography of the closing sequence that is set in motion in the event of a fire. In the case of double-leaf doors, for example, the closing sequence is precisely defined and prescribed – first the passive leaf must close and then the active leaf. If this process does not happen seamlessly, the protective effect of the door can no longer be guaranteed. ➤



People before property

The key to functional reliability is therefore a standards concept that defines precise specifications and test procedures for the various products. These must be complied with – and preferably exceeded – wherever that will bring benefits to the fabricator, user or planner. In this respect, EN 1125 plays a key role nowadays with its motto “People before property”. Escape doors that are equipped in accordance with EN 1125 ensure safe exit in a panic situation, even for people who are not familiar with the surroundings or with the operation of this kind of door. Without a doubt the EN 1125 is the most effective way of protecting human life in emergency and panic situations and represents the optimum solution.

For emergency exits in buildings or areas that are not open to the public and that are only used by people familiar to the location, EN 179 is the defining standard. Both standards share the fact that they must be taken into consideration when planning, installing and signing off escape and emergency exit doors.

The lock, handle and accessories must all undergo testing.

“In future, European regulations will replace or at least influence virtually all national standards”, announced Heinz Schulte with confidence, “and they will focus more and more on conceptual units and the entire door system instead of on individual functional elements”. The formalisation process of norms and standards is already shifting more and more towards European and international levels. In 2008, for example, only 20 percent of the newly published standards were formulated in Germany. This reflects the increasing efforts made by the European Union towards globalisation and harmonisation.

“In principle this development is to be welcomed”, said Heinz Schulte, “as in an area that is as sensitive and safety-relevant as door systems, international norms protect manufacturers, planners, workers and users alike. The first three groups get a high degree of legal protection and the users benefit from the minimum safety requirements.” ■

▼ *People before property: Escape doors that are equipped in accordance with EN 1125 provide a safe exit in panic situations for people unfamiliar with the surroundings.*





◀ Martin Swora,
Product Manager at ECO Schulte

INDISPENSABLE, BUT NOT A CURE-ALL

Interview with Martin Swora on the subject of norms and standards

Mister Swora, how do you keep an overview of the many different norms and standards governing doors?

Martin Swora: When you develop door systems, there's no option but to learn all about the norms and standards. This issue is particularly relevant during the development period. Here I find the collaboration with the German Institute of Standardization, or DIN, very useful in terms of the working parties of the standard committees for product norms. I learn a great deal here while at the same time incorporating my experience and specialist knowledge from the point of view of the manufacturer.

What are the most important norms and standards?

Martin Swora: Every norm is important and has its justification, whether it's a norm governing fire protection handles (DIN 18273 / EN 1906), door closers (EN 1154) or other products. The overall interaction is critical. What use is it if the whole door with all its parts initially works well then fails because a single, unauthorised, non-standardised component proves defective? For that reason, for example in the norm governing panic door locks (EN 1125), all key components such as locks, handles, and push bars must be tested together. Otherwise they will not be approved. At ECO Schulte we satisfy all these requirements in full, as we manufacture and test all our products ourselves and check their interaction – our very own "System technology for the door".



⤴ If the user is not fully aware of safety issues, it can lead to problem situations. Here the emergency exit has been thoughtlessly blocked. No norm or standard can help in this situation.

Are norms and standards a cure-all?

Martin Swora: Of course not! During my many years of professional involvement in the door fittings industry one thing has become clear to me: a norm on its own doesn't save a single human life if the user of the door has not been properly trained and made aware of safety issues. That is why we also offer product and certification training, so that our own employees and our customers are always kept up to date with the latest developments. ■



HOSPITAL SAFETY

PARADOXICAL LOCKS

Cumbersome beds, emergency situations, hectic doctors and nurses, patients with walking aids, people in wheelchairs, and visitors with children: there is a lively flow of traffic in the halls and corridors of hospitals, since these act as the arteries of this complex organism. The valves of these arteries – namely the doors – play an important role when it comes to safety and security.

There are a great many doors in a hospital: Automatic doors with sensors or buttons, push doors with sensors or manual operation, manual doors and lift doors. They are the gateways between the individual functional areas and they have a wide range of different, sometimes contradictory remits. They channel the transport flow of patient transfers, visitors, food and waste and at the same time protect people, buildings and property.

The importance of the dual role of hospital doors is underlined by the facts: There is a fire in a German hospital approximately once every two weeks, and it is not uncommon for this to lead to death or serious

injury. Most of these fires are caused by technical defects, since hospitals have countless electrical devices, followed by arson and carelessness – either at the construction stage or as a result of smoking. Criminal acts are almost a part of everyday hospital life. “The biggest problem is theft from hospital rooms, for example money, smart phones or notebooks”, claimed Matthias Gehle, Head of Sales at ECO Schulte, “and such an experience can be traumatic for an ill, vulnerable person.” But drugs, valuable medical equipment and – not to be underestimated – research results or patient data are increasingly becoming the target of break-ins and thefts.

Human life takes top priority

Protection has a double significance in a hospital environment: the ability to lead patients with restricted mobility, visitors and staff to safety in a hazardous situation plus the need to secure the property of patients and of the hospital itself in the face of unauthorised intrusion. Hospitals therefore need doors with an advanced safety concept, which have clearly defined objectives and the ability to prioritise if there should be a conflict of objectives.

In undisputed first place is the protection of human life, referring in this case to patients, visitors and staff. The ranking of further objectives, such as the protection of medical equipment, drugs and data, and also soft factors such as visitor friendliness, accessibility or a pleasant environment, depends on the individual situation and has to comply with the numerous relevant norms and building regulations that apply in this area.

The prioritisation of objectives determines the specification of the doors in different areas of the hospital. Since the protection and rescue of human life in hazardous situations has top priority, fire and smoke protection doors are of the utmost importance. "Smoke gases are a major issue: fire smoke is extremely toxic and it usually only takes a few breaths to cause damage to health or even death", explained Matthias Gehle. In fact, someone

can lose consciousness and even die just a few metres inside a thick build-up of fire smoke. This is extremely dangerous in buildings with many corridors, stairwells and lifts, as here the smoke spreads rapidly due to the so-called stack effect.

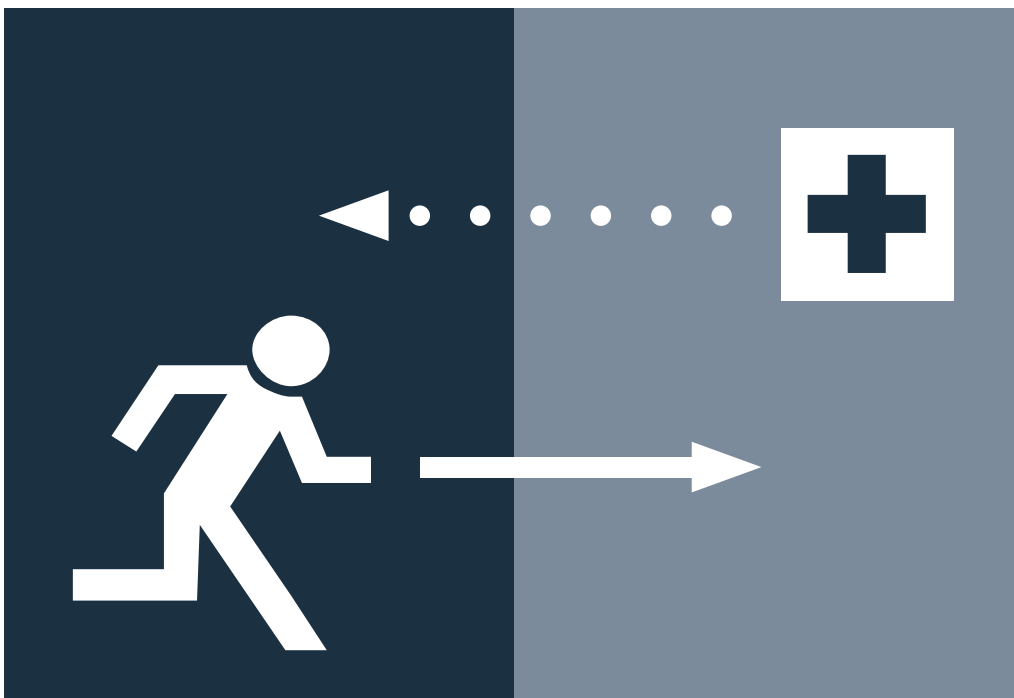
Rapid isolation of smoke-filled sections

In order to isolate smoke-filled sections as quickly as possible, in particular in heavily frequented corridors or in rooms with a high fire load, such as archive and technical rooms, it is necessary to install fire and smoke-proof doors with door closing mechanisms complete with integrated smoke detectors or with connections to a central smoke detector system.

These ensure that the door leaves can remain open when needed yet close reliably in the event of a fire. "This reduces the probability that doors will be propped open for convenience using wedges or heavy objects, which means they would no longer be able to act as smoke protection", explained

Stephan Büttner, Key Account Manager at ECO. If the hallway doors remain closed and only open when necessary, automated door systems are used, as these provide safety as well as convenient access, which is an important criterion in a hospital. >





◀ Mechanical safety measures on the side entrances of hospitals are designed to make it especially hard for thieves to break in. In an emergency, however, the door must be easy to open for those trying to escape from inside and rescuers trying to gain access from outside.

At the same time, the fire and smoke protection doors should not block the escape routes and must be able to be opened quickly and easily by people trying to escape. Panic bars and push bars can be used that open up the escape route in a panic situation and in the case of poor visibility. "Even a child has enough strength to apply the necessary pressure to unlock the door," said Matthias Gehle,

"which is why this solution is also ideal for sick and weakened people." The push bars have the advantage that they extend across the whole width of the door, but in comparison to panic bars they take up about one third less of the space. This brings more light into the corridor and the compact design prevents the bar from catching on things.

The technology is approved in line with the current EN 1125 for escape routes.

Access guarding versus escape route planning

The challenge lies in situations where the need for controlled access conflicts with the requirements for escape route planning. One example could be where a staff area such as a kitchen forms part of the escape route. Day to day no

unauthorised people are allowed to enter these areas but in an emergency the area must offer unhindered access as an escape route.

This kind of management function of the door is solved by a combination of access control systems, door closers and a lock with a panic function. Particularly sensitive areas, such as neonatal units, drug cabinets, laboratories or EDP areas also need to be secured with systems that

control and perhaps document the access but that do not pose an obstacle to escape in the event of an emergency.



The fittings also have a life-saving role to play in the event of fire. Fire protection and smoke protection door fittings are part of a group of special fittings with building authority approval and must prove that they can cope with the required fire resistance duration. "The crucial thing is that they are tested in the system, as they have a particularly high responsibility in the event of a fire," insisted Stephan Büttner. "If just one element fails, in the worst case scenario the complete door system can no longer fulfil its life-saving function." In light of the fact that door systems in hospitals are in constant use for up to 20 years and the large doorways often demand the use of heavy door leaves, this poses a serious challenge to the robustness and resilience of the fittings.

Access for emergency services

All side entrances of the hospital must be secured against intruders. Mechanical security measures are designed to make it as difficult as possible for potential intruders to force their way into the building. As with all unwarranted access, the greater the resistance that the intruder meets, the more likely it is that he

will give up. "The important thing to remember is that these doors need to be easy to open from the inside in an emergency while also being accessible from the outside by the emergency services," explained Stephan Büttner, "which is why mortise locks with a panic function are the solution of choice."

Germ reduction: the topic of the future

The germ load in hospitals is an increasingly hot topic of discussion. Germs that are transmitted through touch represent a serious risk for people in a compromised state of health. In a hospital setting, with its high turnover of staff and visitors, door handles, handrails, door knobs or light switches are typical transmission routes for viruses and bacteria, because they can constantly resettle and multiply on frequently used surfaces, even with regular cleaning. "Since the number of stubborn and resistant pathogens is steadily on the rise, their spread must be stopped as soon as possible," commented Herr Büttner, "and one suitable point of attack is the door handle." He continued: "Here we as manufacturers are being asked to develop new surfaces that offer better protection against contagious diseases." ■



▲ MRSA is not the most dangerous of all hospital infections but it is the best known. It is the cause of around 30% of all hospital infections. Every year it contributes to the deaths of up to 2,000 patients.

A BRIEF GUIDE TO NORMS GOVERNING HOSPITAL DOORS

IMPORTANT NORMS GOVERNING HOSPITAL DOORS

■ DIN EN 1191 / DIN 18095

Test procedure to test repeated opening and closing;
Durability

■ DIN EN 13501-1 and -2 / DIN 4102-5

European specifications and classifications
(fire resistance, fire and smoke protection classification)

■ DIN EN 1363-1 / DIN 4102-2

Fire resistance tests (General specifications)

■ DIN EN 1363-2 / DIN 4102-3/-11

Fire resistance tests
(Alternative and supplementary procedures)

■ DIN EN 1364-1 / DIN 4102-13

Fireproof glazing for non-load-bearing walls

■ DIN EN 1634-1 / DIN 4102-5

Fire behaviour of building materials and structural
elements (Fire barriers)

■ DIN EN 1634-3 / DIN 18095-2

Smoke protection doors; Type approval test for lasting
function ability and seal tightness

■ DIN EN 13916 / DIN 18095

European classification for self-closing mechanisms

■ DIN EN 14013 / DIN 18095

European classification for smoke barriers

■ DIN 18024-2

Barrier-free construction in public buildings and
workplaces

■ DIN 18040-1:2009-02 (D)

Barrier-free construction – Planning criteria –
Part 1: Public buildings





IMPORTANT PRODUCT NORMS

- **DIN EN 179**
Emergency exit locks with handles or push plates for doors in escape routes
- **DIN EN 1125**
Panic door locks with horizontal push bars for doors in escape routes
- **DIN EN 1154**
Door closing mechanisms with controlled closing sequence
- **DIN EN 1158**
Sequence selector
- **DIN EN 1906**
Door handles and door knobs
- **DIN EN 1935**
Single axis door and window sills
- **DIN EN 12209**
Mechanically operated locks and locking plates

SUPPLEMENTARY GUIDELINES FOR ESCAPE DOORS

- Guidelines governing electrical locking systems (EltVTR) for doors in escape routes
- Hospital building regulation § 16 (KhBauVO)
- Workplace building regulation § 10 and § 11
- BG rule 232 and workplace rule ASR A1.7 "Doors and Gates"
- Standard building regulation § 37 (MBO)
- Regulation on places of assembly § 9 (VStättVO)

SPECIAL FEATURES OF ESCAPE ROUTE PLANNING

EMERGENCY EXITS – DO THEY NOT EXIST?



An "Emergency Exit" is a term in general use for a door designed to be used in the event of an emergency. In German the word for this kind of door is "Notausgang". And yet, in the world of building regulations, this term does not even exist. What's going on here and what requirements need to be satisfied?

In Germany, emergency exits are officially described as doors in the path of escape and rescue routes. Rescue routes must enable humans and animals to be rescued in dangerous situations. For doors in the path of escape and rescue routes the following specifications apply:

1. **They must open in the direction of the escape (MVkVO §15, Para. 3);**
2. **They may not have a raised sill (MVkVO §15, Para. 3);**
3. **They must be able to be opened from inside with a single handle across the full width (MVStättV §9, Para. 3, Line 2, MVkVO §15, Para. 3, MHHR, Para. 4.4.1);**
4. **Electrical locking systems are only permitted if the doors can be opened at any time in the event of an emergency (MVkVO §15, Para. 3)**

In order to satisfy the current specifications, doors in escape routes must have some special features. One key element of this kind of door is a so-called panic lock. When the door is locked, this allows the door to be opened with the door handle in the direction of the escape. In the event of an emergency, escape routes are also access routes for firefighters or other emergency services. For that reason doors in the path of escape routes must also be able to be opened from

^ Not specified by building regulations but life saving in an emergency: push bars and panic bars on doors in escape routes.
Photo: Steffen Füssel / vor-ort-foto.de

the outside, perhaps with a key. Fires often break out in dangerous situations. Recent events have demonstrated time and again that escape routes cannot only be planned for the event of a fire. In the case of violent attacks, escape routes take on a particular significance.

It's all about width

Where the width of the door is concerned, the building regulations tend to be quite general. Paragraph 7 of the regulations governing places of assembly states: "The width of the escape routes should be calculated according to the largest possible number of people (see MVStättV §9, Para. 4, Line 1)". In the case of double-leaf doors it is recommended that a so-called Full Panic Option is used. If the active leaf locks the passive leaf, just one handle can be seen on the door in the escape direction – which means that the passive leaf can be opened when the active leaf is open.

If the passive leaf can be locked, a handle will be installed on each door leaf. The door can then be opened using either handle. However, certain requirements do need to be met. The lock combination for the passive and active leaves must form a tested unit. In the escape direction a so-called panic flap can be seen on the top edge of the passive leaf. This panic flap can be used to open the active leaf so far beyond the passive leaf that the correct closing sequence is ensured. For this the gap between the active and passive leaves must be big enough to allow the door to be opened by the passive leaf. Time and again doors can be seen that have too narrow a gap between the passive and active leaves. This means that the door can only be opened by force by pushing the passive leaf, resulting in damage to the door elements.

One particular specification for outside doors can be the requirement for no raised sill. Outside doors must, depending on regulations, comply with specifications

regarding rain tightness or air permeability and resistance to wind load. Sills are often used to this effect. These cannot simply be left off as the doors will then no longer comply with the performance features. This has to be clarified in advance. We keep hearing that doors in the path of escape routes need to be fitted with so-called panic bars. There are no specific building regulations to this effect. This has been confirmed explicitly by the Fachkommission Bau (German Building Commission).



▲ *Outright negligence: with such lack of judgement, not even panic bars can help.*

Conclusion

Before ordering doors to be installed in the path of escape routes, careful investigation is required in terms of the relevant conditions. The specifications are extensive but not impossible to grasp. Doors in the path of escape routes tend to act as fire protection doors within buildings, often with additional requirements in terms of smoke

protection. Retrospective changes to these doors, such as a move to Full Panic options, are not possible here, or only to a limited extent. It is no longer enough to simply alter existing outside doors as these are also required to have tested structural components. ■



▲ **About the author:** *Dipl.-Ing. Hans-Paul Mink is an officially appointed and sworn expert in the field of doors, in particular fire protection, smoke protection and burglary resistant doors and accessories, and in metal processing. He also owns the engineering practice Mink, based in Rödermark: a test and planning office for fire protection, moisture proofing and security technology for doors, gates, windows and facades. For many years he has also been a journalist and lecturer in this specialist area.*



Photo: Alfred Pany

THANKS TO FREE-RUNNING DOOR CLOSERS

MAXIMUM SAFETY FOR ALL LEVELS OF CARE

In Vienna's Wilhelminenberg district, the Wiener Krankenanstaltverbund, an association of healthcare facilities, is in the process of building the "Liebhartstal II Innovative Residential and Care Home". This forms part of a major building programme in the health and care sector. It has been designed to provide senior citizens with a comfortable and safe home for all stages of care. The door closers from ECO are playing a small but important role in the safety concept of this project.

The complex of buildings that makes up the Liebhartstal Innovative Residential and Care Home (known locally as the IWP) lies in a picturesque location on Ottakringer Straße in Vienna's 16th district, with views out over the hills to the north-west and the city suburbs to the south. It is based around an old building, which has been modernised and extended with the addition of a generous new section. The buildings encompass a green space with its own restaurant. There is a car park to the north-west. The complex also has a two-storey market place with reception, doctors,

food shops, a hairdressing salon, a multi-purpose hall and other facilities designed to make life independent and comfortable for the residents. Once it has been completed in spring 2014 around 280 residents will live here in their own apartments, either independently or with individual care. To achieve that end, the apartments can be rearranged to provide residential care where needed thanks to flexibility in terms of layout, features and service provision. This way the residents can remain in their familiar surroundings even if they are ill or need long-term care and do not have to be



▲ Reinhard Spendlhofer demonstrates one of the doors in the IWP Liebhartstal, which is fitted with the SR-EF-1S slide rail from ECO. Photo: Alfred Pany

transferred to an inpatient facility. It is an innovative and humane concept, which had to be planned in great detail, and which focusses primarily on the wellbeing, safety and comfort of residents.

Maximum safety with minimum effort

In order to ensure maximum safety in the residential properties, a sophisticated fire protection concept was developed, as fires are not uncommon in elderly care homes. In Germany, for example, there is a notable fire in an elderly care home on average once a week – often resulting in death or injury, and high levels of damage. A rapid evacuation and protection from smoke are the main priorities here in order to save human life, especially as many residents are limited in their mobility. For that reason the doors in the living quarters were equipped with 280 free-running door closers supplied by the Menden-based door system specialist ECO. “The FTS-63 is particularly well suited

for use on fire and smoke protection doors in elderly and other care homes, as well as in nurseries, schools and hospitals. The free-running function means that users do not need much additional strength to open the doors”, explained Reinhard Spendlhofer, who worked on this project in Vienna on behalf of ECO. This is made possible by the use of an electromagnetic hold-open system, which holds the lever arm of the door closer in an open position during everyday operation. In combination with a smoke detector, the magnet is automatically deactivated when the presence of smoke is detected so that the door closer can resume its normal function. At that point the lever arm will secure the door to protect residents from the smoke.

Good design need not hide away

In the active leaves, connecting doors and stair access doors around 50 SREF-1S slide rails from ECO were used in combination with the ECO Newton TS-41 or – depending on the closing force required – the TS-61 for safety. “If required these doors can be held open electro-magnetically. In the event of a fire or power failure the active and passive leaf will then close in the correct sequence and isolate the smoke sections”, explained Reinhard Spendlhofer. The ECO representative for this project was not just guided by functional requirements when equipping the IWP, but also by aesthetic considerations. Both the slide rails and the door closers have won high calibre design awards: the SR-EF-1S was awarded the Red Dot Design Award 2012 and the ECO Newton won the iF Product Design Award 2012. “This is engineering at its best. The minimalist stainless steel design does not need to be hidden away, and all at an excellent price-performance ratio”, said Spendlhofer. ■



▲ Thanks to the free-running function of the FTS-63 elderly residents do not need to use any additional force to open the doors in everyday situations. The picture shows the variation with built-in smoke detector.

IDEAL FOR PUBLIC BUILDINGS – THE ETS 73

A ROBUST ALL-ROUND DOOR MECHANISM

Large, heavy doors are commonly installed in public buildings, where they have to face up to constant use. And since they cater for so many people, they also need to provide easy access for weaker individuals. Motorised opening – controlled closing: this is the motto of the electromotive drive unit of the ETS 73: 73. It is particularly strong and therefore opens and closes doors weighing up to 250 kilograms and of a width of 1.6 metres, all with virtually no noise. It complies with the current standards EN 1155, EN 16005 and DIN 18650.

Simple and flexible: the slide rail of the ETS 73 can be either pushed or pulled – an installation decision that can be made on site. With its integrated wind load compensation, the ETS also identifies changing pressure conditions that could affect the door leaf, and compensates for these by means of additional motor and braking strength. This means guaranteed safety up to wind strength 9!

However, different doors in a building get a different amount of use. A hotel entrance may be used more frequently than an office door. The ETS 73 therefore has two standard settings: On Full Power the door opens quickly and automatically, with the help of a sensor strip, which constantly monitors the motion area. In the case of an office door or in

private households, that it not normally needed. Here there is no need for sensor strips and the door can operate in Low Energy mode.

Where there are lots of people, fire protection is a major issue. If fire should break out, people need to be able to leave the building quickly and easily. Conversely, the doors should contain the fire load in order to prevent the fire from spreading. With the ETS 64-R, ECO Schulte has designed a motorised unit especially for the requirements of fire and smoke protection doors. Any outbreak of fire is picked up by the built-in smoke detector. This guarantees that the door will close securely, and thus protect residents, guests, patients, customers or staff, even in the event of a power failure. The converse effect is also possible: with the inverse function, the drive unit can allow smoke to be released from the building. The door then opens automatically, even in the absence of mains electricity.

All these functions are pre-installed and can be adjusted at any time. A menu-guided checklist makes it easy to set up for the first time on site. All further parameters of the ETS can be adjusted and installed simply and easily according to the specific demands, all without an external control module or laptop. This makes the ETS particularly interesting for installers and service companies, who do not then need to have a separate external programming device or special software for every type of drive. ■



◀ “Motorised opening, controlled closing” is the motto of the ETS 73 from ECO.

LABOUR-SAVING

ECO NEWTON TS-62 DOOR CLOSERS FOR EASE OF ACCESS

As the name suggests, a door closer is designed to close doors automatically and reliably. In many areas of application, that has a life-saving function, as is the case with fire and smoke protection doors. Alternatively, it may simply serve to keep a door closed to conserve heat or to prevent draughts. The power needed by the door closer for the closing process is generated by the opening process: a spring stores the energy and releases it again for the corresponding closing process with hydraulic cushioning. The power is supplied by people, who use their muscles to push the door open.

It is at this point that the DIN Spec 1104 (CEN/TR 15894) kicks in. Its aim is to ensure that children, handicapped people and the elderly can open the door effortlessly. Within the range of a door opening angle of 2 to 60 degrees, it provides a strongly decreasing opening torque of around 40 percent. For the user, this means that the opening resistance is noticeably reduced. This is of particular importance in nurseries, residential and care homes, hospitals and everywhere where people need convenient access with very little effort.

For these applications ECO has developed the new ECO Newton TS-62. Its new gear technology ensures

that self-closing doors can be opened with minimum effort, in compliance with DIN Spec 1104. The ECO Newton TS-62 actually achieves a decreasing opening torque of around 50 percent, which is significantly more than that prescribed by the DIN specification. Users require around one third less power to open the door than with a conventional door closer with the same closing strength. Thanks to the adjustable closing strength of EN2 to EN5, this innovative door closer naturally also guarantees powerful closing in an emergency. The ECO Newton TS-62 is part of the ECO Newton series of door closers and fits perfectly in the design concept of this product family: not only can it be combined with all ECO Newton door closers in the property, but also with all ECO closing sequence controls (EN 1158) and hold-open systems and mechanisms (EN 1155). ■

^ The ECO Newton TS-62 enables labour-saving door opening in line with DIN Spec 1104.



◀ Heinz Schulte, one of the three Managing Directors of ECO Schulte.

**HEINZ SCHULTE INTERVIEWED BY
GÜNTER RUHE / FEUERTRUTZ**

THE ISSUE OF FIRE PROTECTION LOOMS EVER LARGER

At the FeuerTRUTZ trade fair in the middle of February 2014, ECO Managing Director Heinz Schulte spoke to Günter Ruhe, Publisher and Editor in Chief of FeuerTRUTZ Brandschutz Magazin about the issue of fire protection. We would like to thank Feuertrutz GmbH, a publishing house specialising in fire protection publications, for allowing us to print the following article in Doorlab. The questions were asked by Günter Ruhe.

Mister Schulte, ECO manufactures handles, door closers, locks and hinges. What particular fire protection specifications do your products facilitate?

Heinz Schulte: All our relevant products are regulated by product norms and have to comply with special requirements, which vary according to the different products. In

the case of door hardware we at ECO Schulte work actively to support the norms and standards, including fire protection standard DIN 18273 / EN 1906. The carefully monitored product norms oblige us to have our products tested by independent institutes and our own manufacturing process also has to be monitored.

Many find intrusion prevention and fire protection to be contradictory concepts. Yet there are good solutions for all requirements. Do you still see any gaps?

Heinz Schulte: In the course of the standardisation of norms and standards within Europe over the last few years – in other words the creation of EN standards – many good experiences have been taken on board and some have already been actively adjusted and significantly improved. When it comes to norms and standards, standardisation through changes is absolutely essential.

Panic situations represent the highest loads for escape routes and the corresponding doors. The panic function features sometimes form the basis of discussions with fire protection authorities. Do you have any recommendations?

Heinz Schulte: In properties today there are various different requirements for escape routes, fire isolation areas, fire protection, smoke protection, barrier-free access etc. This often makes it difficult to find the right panic function for the appropriate application, and to provide the right advice. Our decades of know-how and our new information films, which explain panic functions and solutions, are very much appreciated by our customers. They can be found on our homepage and in the ECO Schulte YouTube channel.

What are the current trends for handles and door closers with fire protection specifications?

Heinz Schulte: The trend for construction products with fire protection specifications is to ensure the long-term, high quality implementation of the EU standards. One key requirement in this market is to come up with product solutions for much larger, heavier doors while still offering sophisticated product design. We have mastered the art of translating high functionality into good design, as is proved by the example of our design-award winning door closers from the ECO Newton series.

How do you reconcile the design considerations of architects, such as the increasingly shallow profiles of profile doors, with the demands of full panic features?

Heinz Schulte: At the development stage we focus primarily on functionality and good design. We always aim to comply fully with the building regulations (EN standards) as well as satisfying the demands of architects and planners.

The regulations covering building products also apply to ECO products. What have you done so far?

Heinz Schulte: The EU construction product directive 89/106/ EWG has been superseded by EU construction product directive 305/2011. This became compulsory in the EU from 1 July 2013. We managed to get all the necessary performance declarations onto the Service & Download pages of our website in time. This required a certain amount of overtime and a great deal of painstaking work.

Do you see any obstacles for your products with regard to the current developments in Europe?

Heinz Schulte: Basically no, as we can see an increased implementation of the European norms and standards in individual countries. However, in many cases it is still necessary to comply with country-specific standards. This often means additional test criteria and the corresponding approvals, which are not always transferable and therefore demand a separate evaluation and solution. This results in a not inconsiderable degree of time and effort in terms of implementation.

Is there any demand for EPDs?

Heinz Schulte: Demand for EPDs (Environmental Product Declarations) is growing fast, as environmentally conscious construction is a key issue of the future that is gradually entering the forefront of public consciousness. We have done our homework: All ECO products have EPDs in accordance with ISO 14025 and EN 15804.

You were an exhibitor at FeuerTRUTZ in Nürnberg. What impressions will you take back to Menden with you?

Heinz Schulte: We are delighted to see that our core competence, fire protection, is becoming an increasingly important issue in the industry. We – the entire ECO Schulte team – will continue to work passionately to rise to the current challenges and to develop high quality product solutions in the field of fire protection, smoke protection and escape routes. ■

► The QR code links directly to the information videos of ECO Schulte, explaining the various panic functions in a comprehensible way.



HERE BE DRAGONS!

THE WORLD'S MOST INFAMOUS DOORS AND GATES

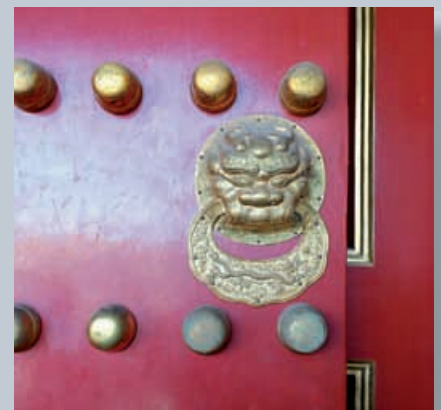
Once you start looking for the most infamous doors and gates in the world, you descend into the deepest depths of human history and psyche. Whether it is Dante's Gates of Hell, the cell doors of Alcatraz or the backdoor concept in computer software – ultimately it is three particular characteristics that alone or in combination turn an ordinary door into something more noteworthy:

1. The door blocks the access to protection, justice or something desirable.
2. Behind the door lurks something terrible – a dreadful secret or something that could harm the entrant.
3. The door then prevents the entrant from going back out again.



TRAITORS' GATE

For centuries a former water tower in the Tower of London has been known by the name of Traitors' Gate. From the 16th century onwards, prisoners who were sent to the Tower travelled by boat along the Thames, and therefore had to pass through the gate in St. Thomas' Tower. As most of the prisoners in the Tower were there for political reasons the former St. Thomas' Gate or Water Gate gained a fearful reputation and became known as Traitors' Gate.



THE GATES OF THE FORBIDDEN CITY IN BEIJING

For centuries, the common folk were not allowed access to the Forbidden City in Beijing, which housed the Emperor's Palace with all the palatial facilities and the Imperial gardens. Only nobles and servants of the Imperial Court were allowed to enter through the entrance gates, which stood at the four compass points. The most famous gate is the northern "Gate of Heavenly Peace" (Tiananmen), which opens onto the square of the same name, although the main entrance is actually the "Meridian Gate" (Wumen), also known as the "Five Phoenix Tower". It was not until 1924 that the gates to the Forbidden City were finally opened to the public, after the last Chinese Emperor Pu Yi abdicated and left the city with his family.

THE CELL DOORS OF ALCATRAZ

For those locked behind the cell doors of Alcatraz there was no hope of escape. Between 1934 and 1963 the high security prison located on an island off San Francisco housed many notorious criminals. The most famous inmate of all was probably the Mafia boss Al Capone, who was incarcerated here from 1934 to 1939. In the 29 years that the prison was in operation there were 14 escape attempts: most of these ended in fatality and none were officially deemed successful. One error in the planning was the doors in cell block D. Unlike the cell doors in the other blocks they were not reinforced with rounded, hardened steel but, due to a lack of money, were clad in flat steel, which could easily be sawn through with an iron saw.





THE MAGICAL DOOR IN THE TALE OF ALI BABA AND THE 40 THIEVES

The 40 thieves in this well-known tale of 1001 nights had hidden their looted treasure in a cave sealed by a magical door. Through his cunning, the woodcutter Ali Baba discovered the magic phrase "Open Sesame" and managed to open the door to the treasure chamber. With the help of the clever slave Morgiana Ali Baba then gradually defeated the band of thieves and took the treasure for himself. Morgiana was granted her freedom and married Ali Baba's nephew. The tale does not appear in the Arabic version of 1001 Nights but only in the European translation. It may have been penned by the French Oriental specialist Antoine Galland, who was the first person to translate the tales between 1704 and 1708.



THE BACKDOOR

The backdoor is a feature of software programmes that allows users to get round normal security measures to gain secret access to the computer. During the recent NSA scandal it became clear that many manufacturers of operating systems deliberately build in a backdoor to allow the friendly secret services online access to computers. Unfortunately, criminals can also take advantage of this opportunity and, for example, infect the computer with malware without the user noticing.

THE GATES OF HELL

In the "Divine Comedy," the famous work of the Italian poet Dante Alighieri, hell lay within the northern hemisphere. Its entrance was guarded by the Gates of Hell, which carried the famous inscription "Abandon hope all ye who enter here." Immediately behind the Gates of Hell was the state of limbo; the destination for those souls who were neither good nor evil in life and who roamed aimlessly here being tortured by vermin. After limbo came the River Acheron and the nine circles of hell, which tapered down to the centre of the earth and were the places of punishment for those who had been condemned to eternal damnation for their sins.



Photo: Wikipedia / Roland zh

ENTRANCE TO THE P1 DISCOTHEQUE IN MUNICH

This is said to be the hardest door to pass through in all Germany, as you can only get into the legendary P1 discotheque in Munich if you can make it past the strict doormen. The actor Dustin Hoffmann, for example, spent an hour waiting outside the door, as did the U2 drummer Larry Mullen, while the members of the rock band Scorpions weren't allowed in at all. The aim of the doormen is to create a lively mixture of guests, from smart suits to punk, with the proviso that at least half the guests must be beautiful women.



THE DOOR IN KAFKA'S DOORKEEPER PARABLE

In Kafka's novel "The Trial" the so-called "Doorkeeper's Parable" tells of the vain attempt of a man to gain access to the law. To do this he has to pass through a door that is guarded by a doorkeeper. However, all through his life he is denied entry, whatever he tries to do. The man is only told that access is possible, but not at that particular time. As he is dying he asks the doorkeeper why nobody except him had ever tried to gain entry. He is told that this entrance was only made for him and would now be shut. There are many meanings for this parable, such as that the man never gained access because he sought approval for each of his steps, thus absolving him of his own responsibility.



Photo: www.zeno.org - Zenodot Verlagsgesellschaft mbH



JIM STEINER ON COMPLEX DOOR SYSTEMS

A TRICKY SITUATION

BSW SECURITY AG is one of the leading companies in the security industry. Since 1977 this Swiss company has been actively involved in building security technology. Through its branches in Switzerland and Austria it sells integrated system solutions (burglary alarm systems, video technology, access control, time recording, fire detection systems, escape route surveillance, in-house communication systems) and door components. Doorlab spoke with BSW Managing Director Jim Steiner about the challenges posed by the planning of complex door systems.

Mister Steiner, how do you define a complex door system?

Jim Steiner: Door systems play a key role in a property, as they are the interface between rooms or between the inside of a building and its surroundings. In general they are the point at which the safety of people and the protection of property are decided. This neuralgic hub sees a coming together of building technology, control systems, security and protection systems. The greater

the demands for protection and safety, the more complex the door system. This is due to the fact that solutions have to be found that negate the contradiction between the two demands. For example, it should not be possible for an intruder inside the building to walk out unhindered or unidentified through the escape route doors. At the same time, however, people who need to escape from the building in an emergency must not be held up by closed doors. A tricky situation.

What challenges are faced by someone planning a complex door system?

Jim Steiner: The planner of a door system needs to bring a wide range of different demands under one umbrella – and that’s far from easy. First and foremost you have the building contractor and the architect, who frequently have very different views of the door system. What should the door look like – standard or custom built? Is this a room door, a single or double-leaf corridor door, a front door, a glass door, a sliding door, a swing door or a locking solution? What category of user does it need to cater for? Is the door on an escape route? What requirements are stipulated in terms of fire protection, smoke protection and heat venting? Are there special demands in terms of air conditioning or noise? Should the door be barrier-free? Should it be intrusion-resistant and should access authorisation systems be included? And as if these questions were not complicated enough, there are also a whole lot of standards and regulations that need to be taken into consideration.

What special points does the planner need to take into account?

Jim Steiner: If the planner cannot comprehend exactly what the architect and building contractor want to achieve – which is quite a common occurrence – he is well advised to design a door system for universal use. That means he should integrate ductwork into the design that equip the door for possible cable connections and anticipate any necessary approvals. Inclusive planning is, after all, better and cheaper than retrospective installation.

What support can the manufacturer offer?

Jim Steiner: In principle every manufacturer should provide very good documentation with its products. The properties and performance of the product should be well defined, and all performance features, such as which profiles the product has been tested with, should be provided with the appropriate evidence. Planners and door builders also need DWG diagrams and circuit diagrams. I would say that these are really hygiene factors, which make the job of the metalworker or door builder much easier. Otherwise

they have to chase the information and the approvals, which takes time and effort.

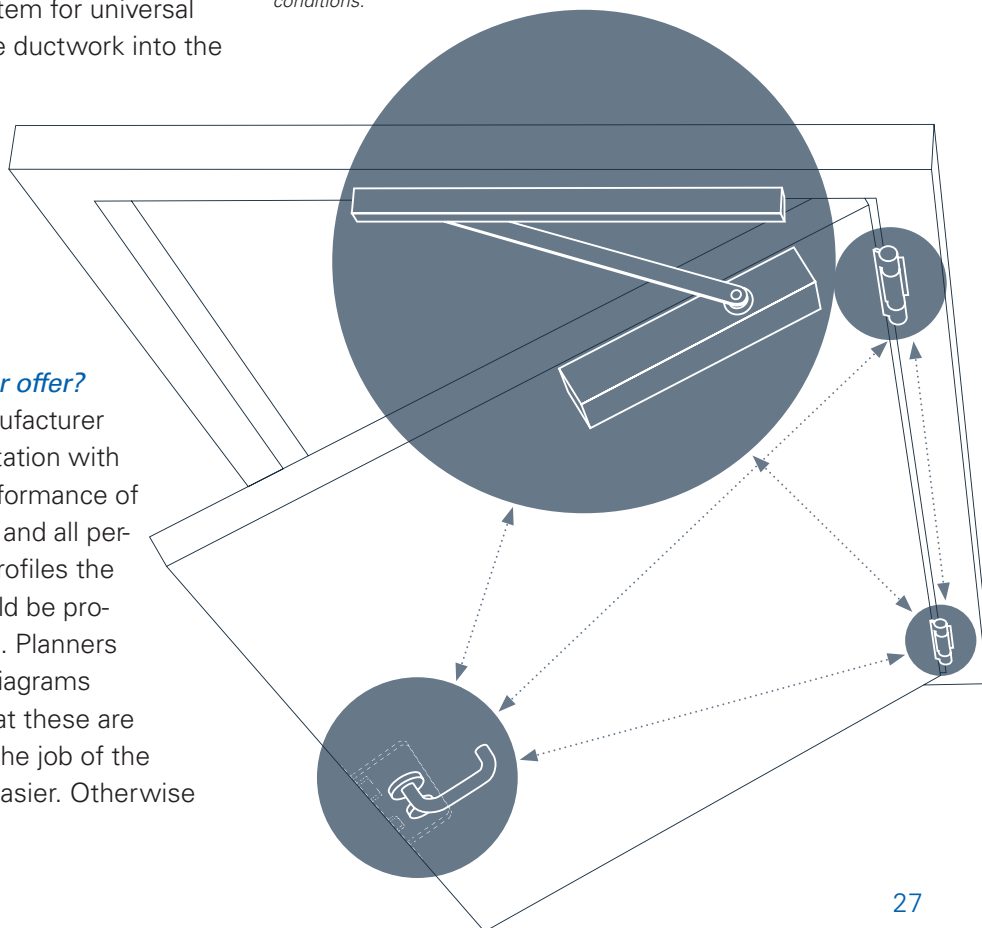
How important are coordinated systems?

Jim Steiner: If products from various manufacturers need to be combined in the door, it has often been the case in practice that not every combination works seamlessly. It is only when the individual elements of lock, handle and accessories are perfectly designed to work together that the system can function at its best even under extreme conditions. And that is an indispensable prerequisite in order to save lives in an emergency. It is not for nothing that EN 1125 requires that the panic bars, handles, locks and accessories of a door in an escape route need to be tested, approved and labelled together. And a door system that complies with all the standards naturally also offers protection from liability in the case of damage.

Who is responsible when something goes wrong?

Jim Steiner: It depends if the door system complies with all the standards or not. If not, then the installer, usually a metalworker, is normally liable. He then has to explain why he did not comply with the norms ➤

▼ Only when the individual elements are perfectly designed to work together can the door system function at its best even under extreme conditions.



and standards. If he cannot prove beyond all doubt that he has built the system according to the instructions provided by the architect or building contractor, then he will be left holding the baby. However, if the norms and standards have all been complied with, then there is a presumption of innocence, as the system has been installed according to the latest status of technology and the best knowledge and conscience. Moreover the operator of the system is also dragged into the liability issue. Part of the guarantee states that the door installer must provide the operator with information about how many years the door should operate without problems and what conditions need to be met for that to happen – namely the correct maintenance, compliance with the regular service intervals and appropriate usage. He therefore needs to supply the operator with a set of operating and usage instructions, which is another point at which good documentation from the manufacturer can be important.

What happens in a special planning situation when the test criteria of the door are not covered by the regular norms and standards?

Jim Steiner: This kind of special situation is typical in prestige properties, where more value is placed on the aesthetics and effect rather than the use. Current trends, for example, often feature oversized or



^ *Escape doors in heavily frequented areas require regular maintenance to ensure that they can operate without problems for many years.*

extra-high doors, but external facades with high wind loads can also need exceptional solutions. Since in such cases there is no approval, either on the side of the manufacturer or the door installer, the approval needs to be sought on an individual basis. That means that the building regulation authorities will test the door system in question and then issue an approval. In an ideal situation the manufacturer will be able to support the door builder in the approval process by providing equivalent approvals for comparable products. ■

▼ *Stadiums and arenas have extremely high security demands – complex door systems are the norm here. Postfinance-Arena, Bern.*



**INTERVIEW WITH TOBIAS SCHULTE ABOUT
NORMS AND STANDARDS IN CHINA**

UNDERSTANDING WHAT MAKES CHINA TICK

China is gradually moving from an emerging market to one of the largest industrialised nations on the planet. As a result it is developing into one of the largest markets for construction and architectural products. So it's hardly surprising that the norms and standards in China are also undergoing parallel changes. The area of fire and smoke protection doors has been transformed in the last few years. Nowadays the Chinese are helping themselves to the whole spectrum of the international portfolio of door-related norms and standards, and even native producers are complying with these requirements. Doorlab spoke with Tobias Schulte, one of the Managing Directors of ECO, whose responsibilities include the Chinese market, about the current situation regarding norms and standards in China. >

Mister Schulte, ECO Schulte is one of Europe's largest suppliers of fire and smoke protection doors and has more than ten years experience in the Chinese market. How do you see the Chinese market compared to the European one?

Tobias Schulte: There were purported to be around 1,200 door manufacturers making fire and smoke protection doors in China in the last few years. Nobody knows the exact numbers. Since the local Chinese norms are carrying increasing weight, I'm glad to say there has been a strong concentration and shake-out in the market. If I want to compare the markets

in China and Europe I need to look at the whole of Europe, in order to get some kind of idea of the vast scale of the Chinese market. Ultimately there have only been very few high quality brands in the field of fire and smoke protection doors. 70 to 80 percent of the market situation tends to be broad based or in the lowest segment. In addition there is as yet no clear trade structure in place; sales are almost exclusively carried out on an individual case by case basis.

Are the Chinese products moving towards the same quality level as the European ones?

▶ Tobias Schulte, one of the three Managing Directors of ECO Schulte.



Tobias Schulte: Tobias Schulte: For two or three years we have been seeing a steady increase in the quality of products for fire and smoke protection doors. This is partly due to the strengthening of the relevant norms and standards and also to the growing number of influential consumers, who have become much more aware of quality issues.

Do the norms and standards now play a key role in functional doors?

Tobias Schulte: The first step was to introduce norms and standards along with continual improvements. For the second step it was important for the Chinese to effectively stamp down on corruption in this field. For example, they had to put an end to the practice of buying fire protection certificates for door manufacturers. They have therefore introduced a control system that is gaining momentum. Currently in my view it would seem they are rather over-revving the test regulations and the tests themselves. The requirements for Chinese standards have become almost higher than the European ones.

Is there a general willingness to deal with the issue of standards for fire protection products and to comply with those standards?

Tobias Schulte: Here the Chinese are taking a very open and pragmatic approach. This applies in particular to the hardware products for fire and smoke protection doors. There are now working parties and standards committees, who work out the new norms with representatives from the government and the major door manufacturers. The priority in the future will continue to be to make Chinese end consumers aware of these norms and to generate more enthusiasm for them. As in Europe, the norms and standards are primarily there to save human life. This is something that people in China need to understand or be taught. In my opinion the biggest challenge for all concerned is how to communicate and teach this with lasting effect. You have to understand what makes China tick.

Is it likely that the local Chinese manufacturers of fire and smoke protection doors will also look towards Europe in order to sell their products there at an affordable price?

Tobias Schulte: Due to the high level of automation that we have reached in Europe in the manufacture



^ A glimpse of the production lines of ECO in Zhuhai, China. Here products are manufactured at European level for the Chinese market.

of fire and smoke protection doors and the serious challenges in terms of logistics I don't really see any Chinese supplier being able to place their products on the European market in the long term. However, I would certainly not rule out Chinese companies buying products from Europe in this sector. The distribution channels that have developed over the years in Europe should not be underestimated, and this will make it difficult for Asian manufacturers to break in. ■

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■ SYSTEM TECHNOLOGY FOR THE DOOR

