fischer

Fixing solutions in tunnels.



„Whoever chooses fischer receives more than a range of safe products. The aim is to always develop the best solutions for our customers across the globe.“

Besides the innovative products, this predominantly concerns support that is focused on the customer, and services designed to improve customer benefit.

A brand and its promise to perform.

Continious improvement

The fischer ProzessSystem (fPS) we ensure that we areadapting and optimising our processes in line with customer requirements in a fl exible manner and on a continuous basis. Thus we are glad having been awarded with the 1. place “Excellence in Operations” within the challenging contest “Factory of the Year”.

DIE FABRIK DES JAHRES
Global Excellence in Operations
Produktion ATKearney

Award 2015
Exellence in Operations

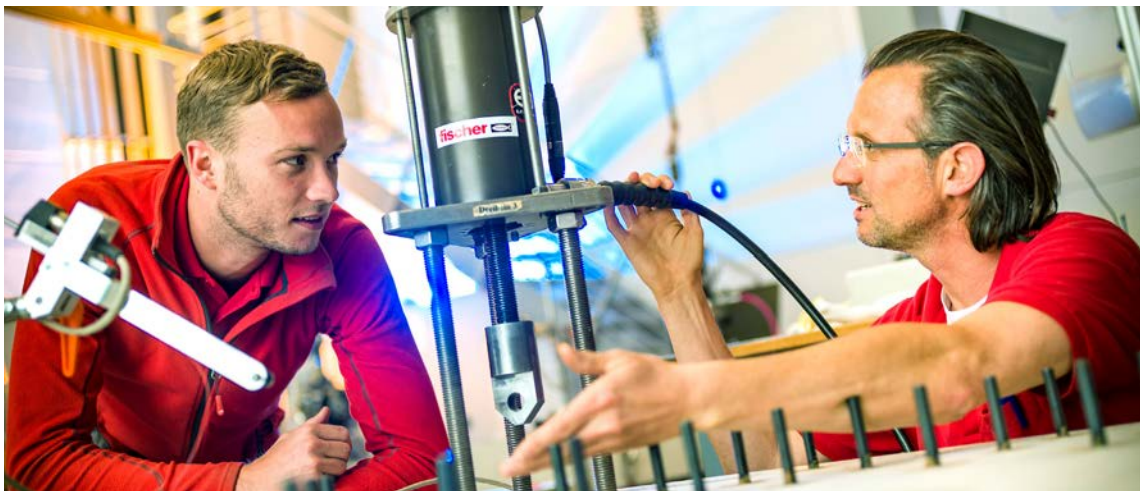
Safety that connects. Decisive quality

We don’t make any compromises when it comes to the safety of our products. A whole host of our products are distinguished by comprehensive, up-to-date and international approvals. The fischer product range is well-positioned in all sectors of fixing technology – Steel, Nylon and Chemical fixings. In awardwinning quality which continues to impress both professional clients and private customers with equal measure.

ICC ES ESR-1990 See ICC-ES Evaluation Report at www.icc-es.org

ETA CE

International approvals characterise many of our products.





Always on the pulse of time

At fischer, innovation is more than just a sum of the patents. We are open to new things and are prepared for change – always with the aim of off ering our customers the greatest possible benefits. Over the years, our own development and production sites have been developing numerous fixing solutions for the most wideranging applications. Be it new production procedures or materials, such as renewable raw materials: We are carrying out the research for your safety and will continue to do so in the future. This gives us such great flexibility that we can even develop tailor-made customer solutions. This power to innovate has seen fischer become market leader in anchor technology and the fixing industry.

Our service to you

We are a reliable partner, one that will stand at your side and address your individual requirements with advice and action:

- Our products range from chemical systems to steel anchors through to plastic anchors.
- Competence and innovation through own research, development and production.
- Global presence and active sales service in over 100 countries.
- Qualified technical consulting for economical and compliant fastening solutions. Also on-site at the construction site requested.
- Training sessions, some with accreditation, at your premises or at the fischer academy.
- Design and construction software for demanding applications.

We take responsibility

Our active environment management policy means that we are helping to maintain an intact environment for our generation and for those that follow. The environment management policy at the Tumlingen site has been certified in line with DIN EN ISO 14001.
It fills us with particular pride that in 2020 we have received the most important and largest award in Europe in the field of sustainability: the German Sustainability Award - category large companies.
This was in recognition of our holistic approach and the strategic anchoring of our sustainability management.
With our greenline products we have launched the first range of fixings on the market that is based on renewable raw materials to more than 50%.



BIOBASED 50 – 85 %
DIN Geprüft
8C029

Greenline assortment based on 50% regrowing raw materials

Deutscher Nachhaltigkeitspreis 2020
SIEGER
Großunternehmen

German Sustainability Award

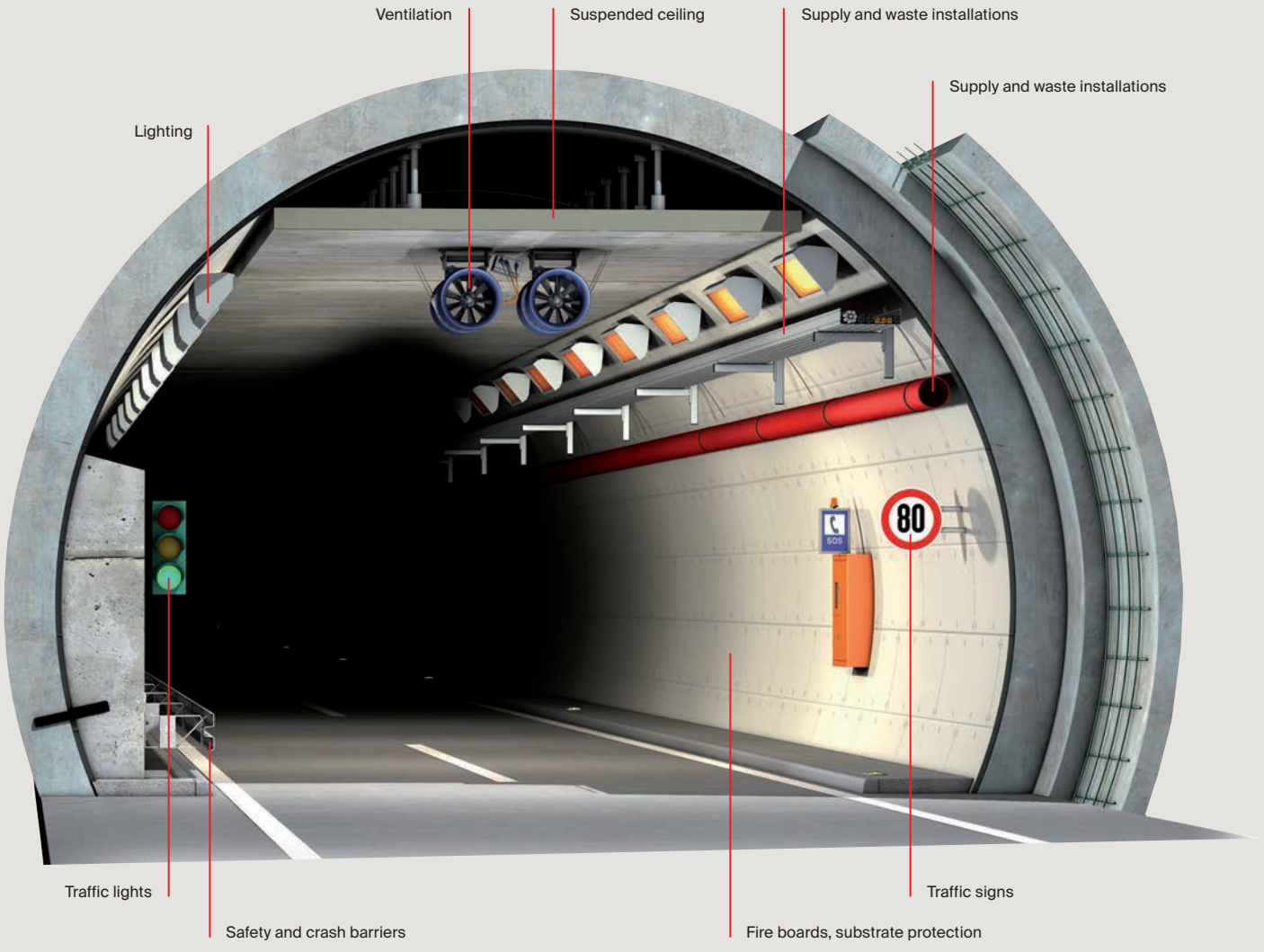
Solutions for rail and road tunnels.

Special requirements for fixings in tunnels

- Long maintenance-free design life.
- Preventing structural damage during fire.
- Resisting fire.
- Safety even in case of seismic influences.

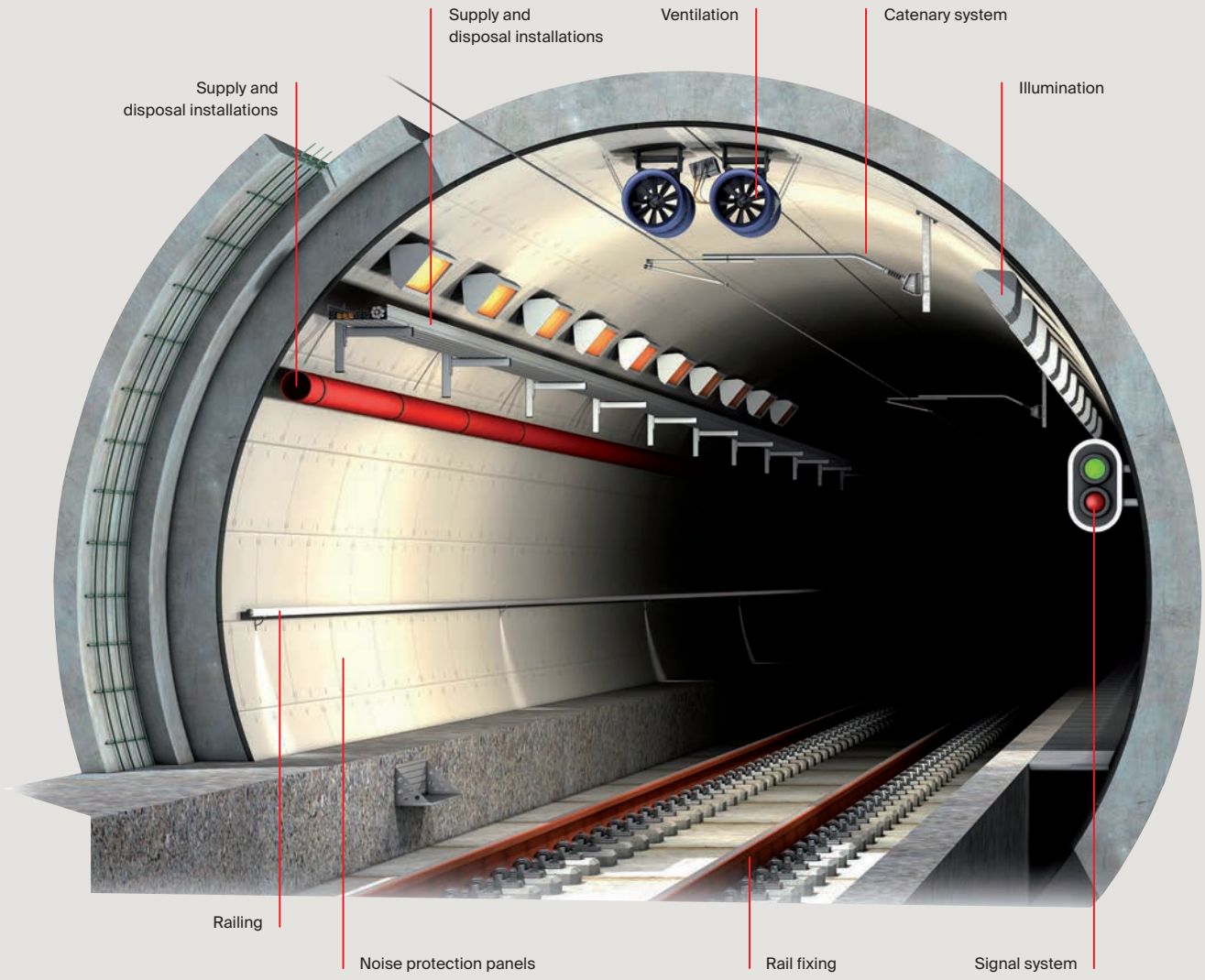
fischer offers

- Long-life products and systems made of materials such as
- stainless steel and of high-corrosion steel.
- Products which are able to resist fire/ seismic/ dynamic or shock loads.



Content.

	Page
· Fire protection	6
· Firestop Systems	8
· Electrical installations / illumination	10
· Power supply – Catenary system and 3rd rail	11
· Rail fixing - track	12
· Safety	13
· Ventilation / smoke extraction	14
· Structural design and steel works	15
· Other equipment and installations	16
· Cast-in Channel Systems	17
· Supply and service tunnels	19
· FMS Systems	20
· Product specifications and accessories	21
· Basic knowledge	22
· References	24



Fire protection.

Sprayed Coating





FNA II



Standard nail head with or without washer - length up to 15 mm or 20 mm.

Washer



Standard size 7,5 x 30 x 1,5 mm in steel grade according to the FNA II.

Spacer



Standard sizes for mesh distance to the concrete of 13 mm or 18 mm.

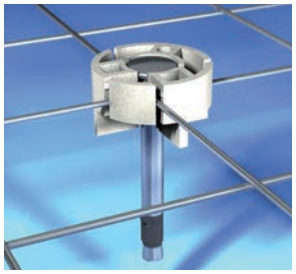
UltraCut FBS II 6

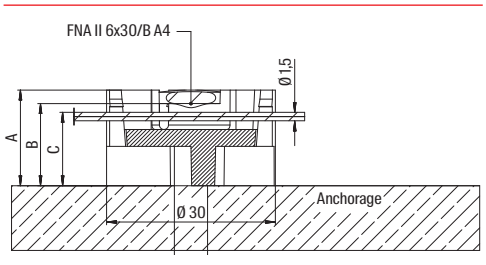


Application

- Fixing of bent or flat reinforcement mesh for sprayed fire protection coating.
- Round or rectangular washers according to system requirements for preformed mesh with FNA II or FBS.
- FNA II with nail head in combination with the patented spacer for flat mesh (wire 1.5 mm). Spacing mesh to concrete surface 13 mm or 18 mm.

Special Products



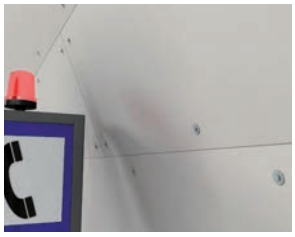


Art.-No. Spacer	Art. Description	Wire Ø [mm]	A [mm]	B [mm]	C [mm]	Coverage [mm]	Air-placed concrete [mm]	FNA II
502724	30x22/18	1,5	22	20	18	> 17	> 35	6/20
504533	30x17/13	1,5	17	15	13	> 17	> 30	6/15
min height	30x12/8	1,5	12	10	8	> 17	> 15	6/10

Further dimensions on request.

Fire protection.

Board Systems





FNA II



FNA II M6



Standard nail head with or without washer – usable length up to 125 mm.

FNA II RB



Detachable nail head with washer – usable length up to 125 mm.

Accessories



Setting / setting tool.

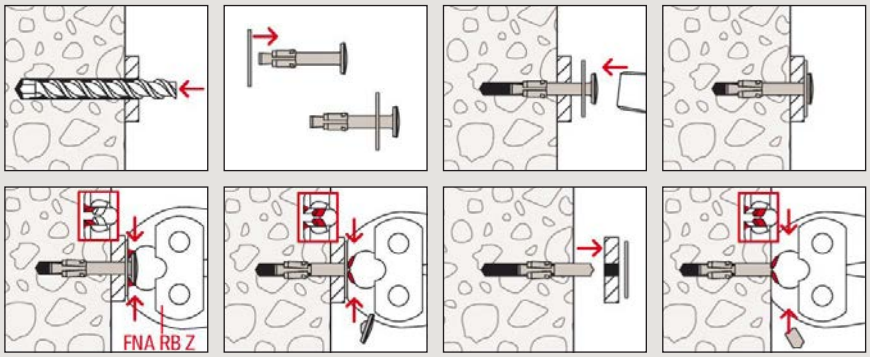
UltraCut FBS II 6



Application

- Fixing of board materials with or without backing strips with total fixture thickness of up to 120 mm.
- Standard embedment depth of only 30 mm (drill depth of 35 mm / red. 30 mm).
- FNA II RB with nail head, detachable nail head, thread nut, or as an alternative the FBS 6.
- Concrete screw FBS with up to 45 mm fixture thickness if the risk of unscrewing by vibration / alterneting deflection of the board is not given.
- Other dimensions for all products on request.
- FNA II has been tested under the severe environmental conditions to represent 120 years time and design can be conducted for such extreme conditions. More tests can be conducted for different products due to the requirements of the projects.

Removable Board Version - FNA II RB
The latest version of the FNA II combines the advantages of the easy to install nail head version and a removable solution.
Just cut the head, remove the board, cut the rest of the bolt close to the concrete surface, twist the board and fix it again.





Firestop Systems. Standards and certifications.

Approvals and markings

British Standard
BS 476-20

BS EN13501-1

BS EN13501-2

BS EN1366-3: 2004

BS EN1366-4: 2006

DIN

American Standard
ASTM E 84 (UL 723)

American Standard
ASTM E 1966
(UL 2079)

American Standard
ASTM E 814 (UL 1479)

BS EN ISO 10140

BS EN 1026

BS EN 1027

ETA CE

CLASSIFIED C UL US

UL EU

FM APPROVED

warrington certifire certification
APPROVED PRODUCT
CF xxxx

certifire





Firestop Systems.

Joint Sealing



Construction joints

FiAM – Flexible Fire resisting Acoustic Mastic



Application

- Penetration Insulation of metallic pipes, non-metallic pipes, cable trays, Cable bunches, small and large openings, voids or cavities in floors and walls, mixed services up to 3 hours.
- Linear joints insulation of flexible and rigid construction elements, joints between FCPS coated panel system up to 5 hours.

Penetration Sealing



Mixed penetration through wall



Mixed penetration through floor

FiAM – Flexible Fire resisting Acoustic Mastic



FiGM – Intumescent Graphite Mastic



FCPS – Coated Panel System

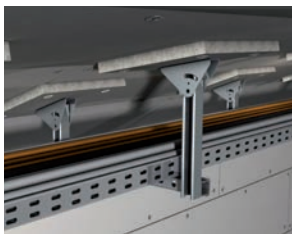


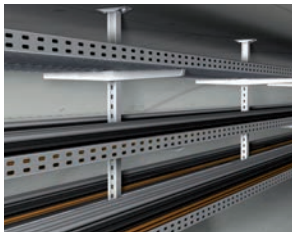
FFSC – Firestop Compound



Electrical installations / illumination.

Electrification





FIS V



FIS V Zero



FAZ II



FBN II



FNA II



Application

- Ductwork for cables or heavy cable trays, using drop-in, through bolt anchors all load requirements can be covered.
- Alternatively with bonded anchors, higher loads and smaller edge distances can be achieved.

EA II



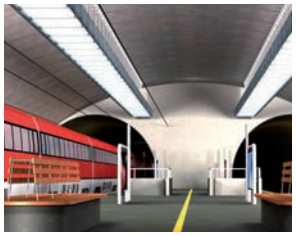
RG M

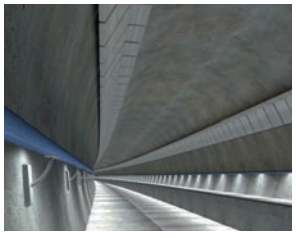


with RM / FIS V / FIS V Zero



Lighting





FIS V



FIS V Zero



FIS SB



UltraCut FBS II



FH II



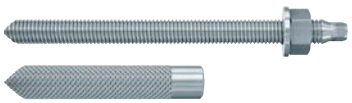
FZA / FZEA



Application

- Emergency lighting or heavy suspended flood lights, whatever your requirements are, with fastest curing bonded anchors, undercut anchors or mechanical anchors fischer can offer the most efficient solution for your application.

RG M / RG M I



with RM / RSB / FIS V / FIS V Zero / FIS SB



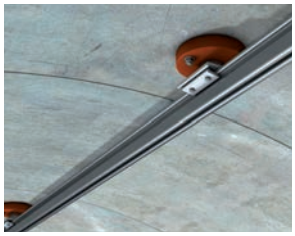
FHB II



Power supply – Catenary system and 3rd rail.

Overhead systems





FIS HB



FIS EM Plus



FIS V Zero



FHB II with FIS HB



FIS A with FIS EM Plus



RG M



Application

- Overhead conductor rail and standard catenary systems are often executed as stand-off installations with high load and safety standards.
- With the fischer bonded anchor range highest loads can be transferred, even with limited drill depth due to layers of watertight membranes in the wall structure.
- The undercut system of the FZA offers highest safety even in cracked concrete.

with RM / RSB / FIS V Zero



FZA



3rd rail systems





FIS V



FIS V Zero



FIS SB



UltraCut FBS II



FH II



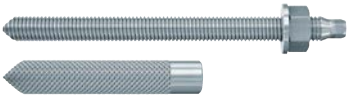
FZA / FZEA



Application

- If fixed on the wall of a tunnel or in a station or outside on a slab track or sleeper, we can assist you to design the most economical fixing solution.
- For threaded rods installed with our epoxy resin FIS EM Plus we can provide electric insulated solutions.

RG M / RG M I



with RM / RSB / FIS V / FIS V Zero / FIS SB



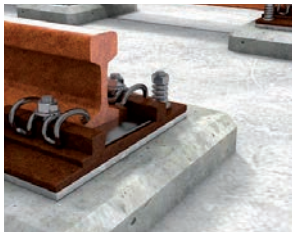
FHB II



Rail fixing - track.

Metro rail





fischer rail anchor RA M22x220
– axle load, electric isolated.



fischer rail anchor RA M22x270
– to axle load, electric isolated.



fischer rail anchor RA M22x310
– to axle load, electric isolated.



Three componant mortar

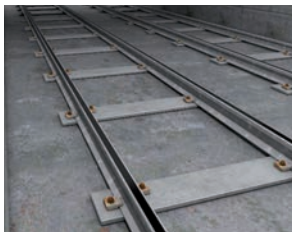


Application

- Light rails for tramways fixed on a slab track are a typical application of the fischer rail anchor RA M22x270. The three component mortar, based on epoxy resin is guaranteed not to shrink, and supports under the high loaded rail base plates.

Light rail systems and temporary systems





FIS EM Plus



FIS A



UltraCut FBS II
– for temporary installations during construction.



Application

- In longer tunnels commonly used rail systems for material transports creates challenging boundary conditions for the fixing: high safety, fast installation easy to removal. The fischer FBS covers all these demands.

Safety.

Safety and emergency systems





FIS V



FIS V Zero



FIS EM Plus



FIS SB



FBN II



EA II



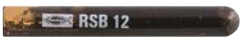
Application

- For fixing of emergency exit doors, signs, emergency illumination, video surveillance systems, sensors, detectors, speakers and much more, depending on load, required fire resistance and product lifecycle, fischer offers a wide range of solutions covering different local standards.

RG M



with RSB / FIS V / FIS V Zero / FIS EM Plus / FIS SB



SXR / SXRL



Passenger control and restraint systems





FIS V



FIS V Zero



FIS EM Plus



FIS SB



FAZ II



FHB II



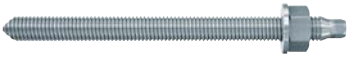
UltraCut FBS II



Application

- Often underestimated but important for operational safety, fixings in stainless steel quality can offer long-term maintenance free utilization of screen doors, automatic barriers or even simple fences.

RG M



with RSB / FIS V / FIS V Zero / FIS EM Plus / FIS SB



Ventilation / smoke extraction.

Ventilation and smoke extraction





FIS HB



FIS V



FIS V Zero



FIS EM Plus



FIS SB



FHB dynamic with FIS HB



FZA



RG M



with RM / RSB



FIS A with FIS V / FIS V Zero / FIS EM Plus / FIS SB



FAZ II



Application

- Ceiling or wall mounted fans are, due to their dimensions and proximity to the passing heavy goods vehicle traffic, usually exposed to dynamic loads. For such cases the FHB dynamic is the right choice.
- Fire traps, smaller fans, and fans not exposed to dynamic loads can be also fixed with standard bonded anchors or undercut anchors.

Temporary supply





UltraCut FBS II



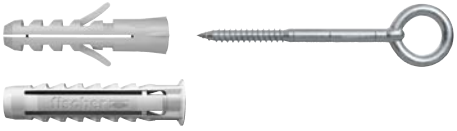
FNA II gvz, A4, FNA II RB



EA II



S/SX with GS



Application

- Temporary air ducts, cables and pipes for ventilation, illumination, water supply and evacuation can be fixed with zinc-plated fixings according to their load requirements.
- Long tunnels with high coverage may also necessitate a special cooling system.

Structural design and steel works.

Structural applications





FIS V



FIS V Zero



FIS EM Plus



FIS SB



FZA



Customised shear bolts



Application

- If high loads according to anchor or rebar theory have to be resisted, with FIS V, FIS V Zero, FIS EM Plus or the new FIS SB Superbond, requirements according to ETA or ICC can be fulfilled.
- Heavy suspended ceilings, wall protections, curbs or separation walls – with bonded or undercut systems in different steel grades and with fire approvals, advanced solutions are available.

Walkway and guard rails





FIS V



FIS V Zero



FAZ II



FH II



FZA / FZEA



Application

- Emergency or maintenance walkways, combined with staircases and ladders, whenever steel structures have to be fixed to concrete, bolt or undercut anchors are standard. But also bonded anchors are used for extreme loads or requirements for sealed, water tight drill-holes.

FHB II



RG M



with RM / FIS V / FIS V Zero



Other equipment and installations.

Light suspended ceilings and noise absorbers





UltraCut FBS M



FNA II



EA II



SXR / SXRL



Application

- Special requirements given by board and stone materials of soundproofing systems which are installed on walls or used as suspended ceiling, can be covered with approved and tested fixing solutions.

Wall cladding





FIS V



FIS V Zero



FAZ II



RG M



with RM / FIS V / FIS V Zero



FZP II



Application

- Whatever material is used for cladding the walls in stations, we have the adequate fixing solution for the cladding itself and substructure if required.
- With the fischer ACT system fischer offers a service and maintenance friendly solution for claddings with natural and artificial stone, HPL, ceramic and glass.

FBN II



SXR / SXRL

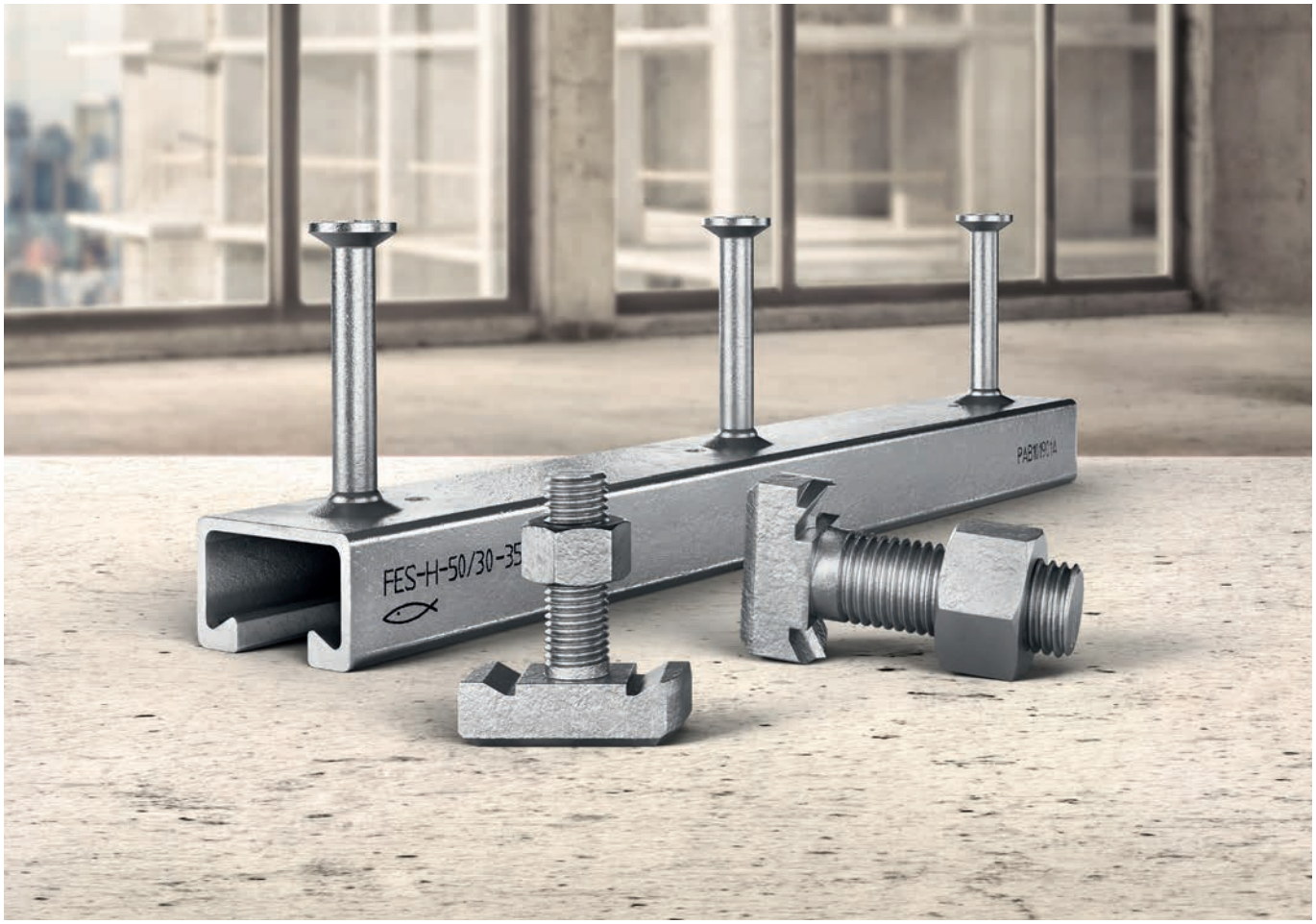


Cast-in Channel Systems.

fischer Cast-in Channel System usually refer to cold formed or hot rolled channels with anchors of either I-shaped or round type welded or riveted to the channels. Nail holes in the channel aid the fixing of channel to wooden or other material formwork, inside the channel there are special form of fillers to prevent the ingress of concrete during casting process. After that, the formwork and the fillers can be easily removed, and the specially designed channel bolt are used to connect various attached items.

Advantages of using fischer Cast-in Channel System products

- Providing adjustability and flexibility.
- Easy installation with simple tools to ensure reduced construction time.
- Prefabricated products diminish construction effort dramatically.
- Time-saving bolted connections rather than time-demanding field welding.
- Helping on pre-designing in structures building development.
- Suitable for cracked concrete structure.
- Applicable for multiple enviroment due to hot - dip galvanization and other coating options.
- Integrated rip-line foam filler protects from concrete intrusion and allows easy and complete foam removal from the channel.
- No damage to existing structures.

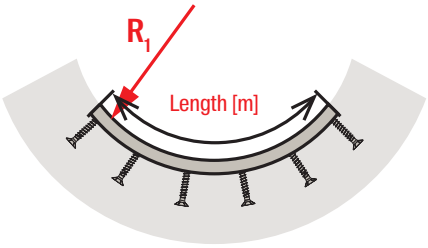


Customised solutions.

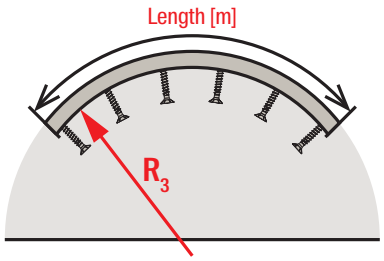
Curved Systems

For those high-demanding applications like tunnel construction, reinforced concrete utility tunnels, curved walls or sewage plants. fischer also provides curved Cast-in Channel System products as customised solution to meet your specific requirements, as well as customised solution to meet you tailored needs in specific applications. These type of special products include curved channel, channel with rebar and others.

Channel inward installation

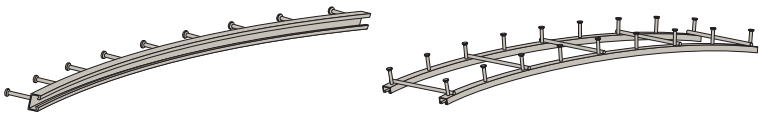


Channel outward installation



Minimum recommended bending radius for alle materials

Minimum recommended bending radius for all materials



Type	Profile	R_1 min [m]	R_3 min [m]	Length min [m]	Length max [m]
Non-serrated hot-rolled	40/22	0.80	2.10	1.50	5.80
	50/30	0.80	2.10	1.50	5.80
	52/34	0.80	3.60	1.50	5.80
Serrated hot-rolled	29/20	0.55	1.80	0.50	5.80
	38/23	0.70	2.10	0.50	5.80









Supply and service tunnels.

Cables and Pipes





FBN II



FAZ II



EA II



FZA



RG M



with RSB



Application

- River underpass, historic city centres or runways and taxi ways at the airport, supply and service tunnels usually have special requests regarding fire proofing and fire resistance of related fixings.
- With our fire rated steel, chemical and even nylon fixing range we offer solutions for all different types of fire tests, up to Hydrocarbon and RWS fire curves.

Installation system





FUS channel



Pipe clamp



Angle bracket UWS



FCAM massive console



Application

- In service tunnels the pipes and cables will be guided by pipeclamps and cable trays which are installed on channel systems. These channel systems are suitable for customized solutions and individual installations by a wide range of different products.
- Depending on the conditions the products are available in all kind of materials and coatings for the prevailing environments (fire, corrosion).

FMS Systems.

Frame construction standing



With mounting bracket FMA 90, 120 or 160, fits massive profiles FMP 90, 120 and 160

Supported structure with variable connectors



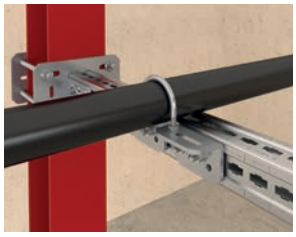
With joint connectors for profile connection FMVB-P and base plate FMVB-BP

Fastening rails to steel constructions



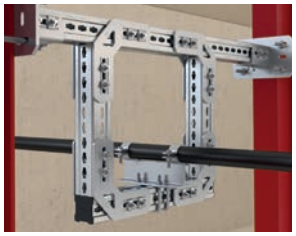
With clamp supports FMBC 90, 120 and 160, fits massive profiles FMP 90, 120 and 160

Fastening to the steel construction



With base plates – FMS Saddle flanshes and FMBP base plates

Hanging frame construction



With two mounting brackets each FMFF 90°, fits all massive profiles FMP 90, 120 and 160

Hanging bracket - construction with base profile on the ceiling



With U-connectors FMUF 90, 120 and 160, fits massive profiles FMP 90, 120 and 160

Application

- Pipe mounts attached to a secondary steel structure are used in technical building services (TBS) and in industrial and system applications. The secondary steel structure is installed in the course of installing heavy-duty pipelines or cable ducts, and frequently includes platforms or bridges suitable for walking on, which are used for servicing purposes.
- Ofte, standard steel profiles are used to attach heavy-duty piplines and cable rack. These are typically planned and pre-assembled, then installed on the construction site.

FMP massive profile



FMC cantilever arm



FMHB hammer-head-push-connector



FMA 4 angle bracket



Product specifications and accessories.

Product overview	Connection thread M	Material: Galvanized steel	Material: Stainless steel e.g. A4	Material: High corrosion resitant steel e.g. 1.4529	Method of operation: Interlocking	Method of operation: Adhesive	Method of operation: Expansive	Type of installation: Push-through installation	Type of installation: Pre-positioned	Type of installation: Internal thread	Relevant approvals for use in tunnels: CE	Relevant approvals for use in tunnels: Zulassung	Relevant approvals for use in tunnels: ETA ESR-2448	Relevant approvals for use in tunnels: Shock approval by the Federal Office for Civil Defense, Bonn.	Relevant approvals for use in tunnels: RWS	Relevant approvals for use in tunnels: R 120	Relevant approvals for use in tunnels: ZTV	Relevant approvals for use in tunnels:	Dynamic
Zykon anchor FZA	6-16	●	●	●	●				●	●	●			●		●		●	
Zykon hammerset anchor FZEA II	8-12	●	●	●	●				●	●	●			●		●			
Bolt anchor FAZ II	8-24	●	●	●			●	●			●		●	●		●	●	●	
High performance anchor FH II	6-24	●	●				●	●		●	●		●	●		●		●	
Bolt anchor FBN II	6-20	●	●				●	●			●					●			
Nail anchor FNA II	6-8	●	●	●			●	●			●				●	●	●	●	●
Highbond anchor FHB II	10-24	●	●	●		●	●	●	●		●					●	●		
Dynamic highbond anchor FHB dyn	12-24	●		●		●	●	●	●			●		●		●			●
FIS EM Plus + FIS A	8-30	●	●	●		●		●	●	●	●		●			●		●	
FIS V Zero	8-30	●	●	●		●		●	●	●	●		●			●		●	
Superbond - System FSB	8-30	●	●	●		●		●	●	●	●		●			●		●	●
UltraCut FBS II	8-14	●	●		●			●			●					●		●	

Helpful accessories





Clips





Electric isolated fixing points

Clips for overhead installation

Clip	Anchor rod	Drilling diameter [mm]	Length of anchor rod [mm]	Material
8-12	M8 - M12	12-14	Up to 1000	PBT
16	M16	18	Up to 1000	PBT
20-24	M20, M22, M24	24-28	Up to 1000	PBT
27	M27	30	Up to 1000	Spring steel
30	M30	35	Up to 1000	Spring steel

Accessories for electric isolated fixing points

Article	Anchor rod	Drilling diameter [mm]	Pazing [pz]	Art.-no.
ACD M 8	M8	14	500	071359
ACD M 10	M10	16	500	071360
ACD M 12	M12	18	500	557240
ACD M 16	M16	22	500	571093
ACD M 20	M20	25	500	071094
ACD M 24	M24	30	500	557241
ACD M 27	M27	32	200	571095
ACD M 30	M30	35	200	071096
ACD M 33	M33	40	100	071097

Basic knowledge.

Cracked concrete



When anchoring in concrete, it is almost presumed that cracks are present in the anchoring area that influences the bearing capacity of the fixings. It is difficult to define all temporary and permanent load cases and to determine if the concrete is cracked or non-cracked. For safety reasons, the use of fixings suitable for cracked concrete is generally recommended for engineers, designers and specifiers. Fixings with an approval according to ETAG 001 for cracked concrete have proved their suitability in cracks and may be used without any restriction in the tensile and compressive zones of concrete members. Fixings suitable for cracked concrete are also checked and approved according to American standards. These “evaluation reports” are prepared according to ACI 318.

Dynamic/fatigue behaviour



The general building authority approved by the German Institute of Construction Engineering in Berlin (DIBt) and the European Technical Approvals (ETA) are generally exclusively for anchoring of static and predominantly static loads. However, in contrast to these current approvals, in practice a number of dynamic effects occur, e.g. increasing and alternating stresses in case of a lot applications in a road tunnel. The main focus in this case is on, e.g. jet vans, overhead sign structures, etc. The applications are influenced by heavy traffic generating compression and sucktion action on interior components.
The fischer Highbond anchor FHB dyn is approved for dynamic loads. The approval applies to anchoring of dynamic loads with unlimited numbers of load cycles, for tension and for shear loads. In addition, the FHB dyn is manufactured in anchor size M16 of high corrosion-resistant steel, material no.1.4529.
Tests have shown that this material - in contrast to the usual standard stainless steel types in the corrosion resistance class III, e.g. A4, steel grade AISI 316- is suitable not only for use in humid internal and external conditions, but also for dynamic loads.

Corrosion

Corrosion is a chemical reaction in which metal is decomposed. The lower quality of the metal (“electrochemical potential“), the material will be even more damaged. In this process it is either converted into flaking rust or worn away in places. These two types of corrosions can be differentiated here. The most frequent types of corrosion in fixings and anchors include:

Surface corrosion

In this case, the metal corrodes relatively uniformly over the entire surface or over a part of the surface. An example of this is the invisible rusting due to condensation of a screw in the transition area from anchor plate to hole. The result: The connection which appears completely intact from the outside fails abruptly.

Contact corrosion

If metals with different quality contact each other in a conductive medium, the less noble metal always corrodes (the anode).
As a consequence, stainless steel is usually not endangered. What is decisive, are the surface ratios of the two types of metal: the greater the surface area of the higher quality metal in comparison to the lower quality materials is, the greater the corrosion becomes.
For example, if large stainless steel sheets are screwed with galvanised screws, the screws will be highly attacked within a very short time. In contrast, using stainless steel screws for galvanised sheets is not critical.

Stress corrosion cracking

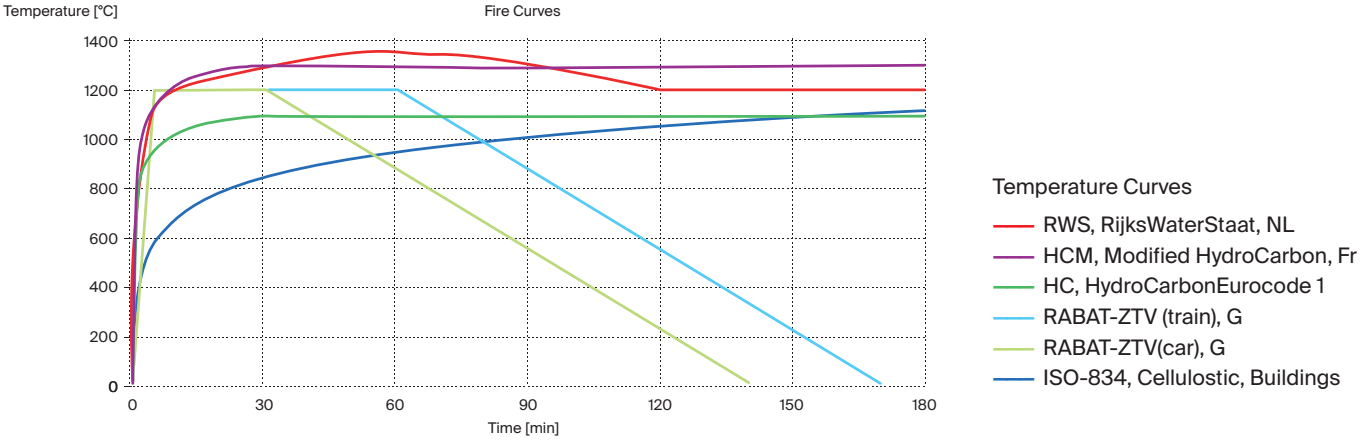
In case of sustained tensile loads, also A4, grade 316 material can be attacked by stress corrosion cracking. In this process, a crack develops due to mechanical stresses and chemical processes (chromium depletion), which grows under sustainded tensile loads in aggressive conditions and thus prepares a path for progressive corrosion.
For example, it occurs with A4 steel in an atmosphere with chemical pollution like road tunnels containing carbon monoxides, deicing materials, etc. Generally stress corrosion cracking is not visible with fixings and usually leads to sudden failure of the anchoring and the construction.

Fire resistance



Systems like cable trays, ventilation or utility systems are tested not only for fire resistance, but also for functional capabilities in the case of fire (e.g. supply lines to sprinkler systems, fire protection boards, etc.). The fire resistance duration of these systems is specified for the application in tunnels according special developed tunnel fire curves.
Actually there are different tunnel fire curves available and it depends to the country and the standard which is set in the tunnel project. The RAB/ZTV (Germany) tunnel fire curve increase to 1200°C within 5 minutes. Anchor approved for the RAB/ZTV curve are the FAZ II, FHB II and FHB dyn, M16 in material 1.4529.
With a higher temperature stress the Rijkswaterstaat (Netherlands) tunnel fire curve attacks the systems with their fixing elements. For this fire curve with a maximum temperature of 1350°C fire board and spray systems with FNA II are checked with a realistic proof.
The last one popular tunnel fire curve is the Hydrocarbon curve. This curve is based on the assumption of a tunnel fire causing with combustible liquids, e.g. petrol, chemicals, etc. with 1100°C during a very long time. In some areas of a tunnel project which are not affected by the traffic itself other fire curves can be decisive.
For example in Germany the Standard Temperature Time fire curve (ETK), based on German standard DIN 4102 and ISO 834. For applications according the requirements to this kind of fire curves there are many fischer products available in the fischer range.

Basic knowledge.





References.

Metro Milan



Challenge
The project ML5 has been developed according to the requirements of the Milan Metro. fischer was the only player capable of providing all required subsystems for the rail fastening solution. fischer has provided engineering and technical support both on and off site throughout the full project period.

Solution

fischer has provided technical products for more than 35,000 rails attachment plates, in particular Rail Anchor M22x270 - 75,000 pcs and 4,800 cartridges of FIS EM 1500. All works have been executed on time and all testing was successful.

Hatfield tunnel UK



Challenge
Challenge on this project was to comply with stringent Highway Agency Design Manual BD 78/99 and Interim Advice Note 104/07.
For the subcontractor, it was important that fischer offered a comprehensive package: advance and fully tested products backed up with a proactive technical support offering not only design consultancy but also site support with installation trainings and suitability site testing in accordance to BS5080 and vigorous IAN 104/07.

Solution

fischer was specified and used on all applications in this tunnel, fixing passive fire protection, M&E services, polyvision wall cladding and tunnel ventilation. FNA II 6x30/30 A4 nail anchor was specified because it was tested as part of the passive fire protection system and RWS fire tests were already available for FNA anchor in conjunction with the specified passive fire protection boards. For fixing jet fans FHB dyn M16x125/50C anchors were used because of its dynamic approval.

Gotthard Base tunnel



Challenge
Long-term safety and minimized maintenance requirements for decades, this was the main requirement of the project owner for the installation of the catenary system. At the same time the system supplier asked for an easy to install, economic solution with adjustable stand-off installation, high loads and limited drill-hole depth.

Solution

FIS A M16 to M30 made of high corrosion resistant steel (1.4529) together with FIS EM was used for about 40,000 fixing points of the catenary system. A systematic quality control with hundreds of successful pull-out tests was established. The heavy installation of the complete catenary system was overhead. Therefore fischer developed and delivered installation clips in nylon and steel, to prevent the heavy anchor bolt slipping out by proper weight, during the curing time of the chemical mortar.

References.

Mont Blanc tunnel



Challenge
After the disastrous fire in 1999 the single tube tunnel with only one lane in each direction was completely refurbished and modernised. In the 11.6 km long tunnel also the tunnel ventilation systems had to be updated. Of course this applies also for the fixings of the 76 tunnel fans. New technical specifications with dynamic loads, high resistance to corrosion and latest standards for fire resistance had to be fulfilled.

Solution

In spite of the defined standards and based on latest state of the art know how, fischer decided to propose an alternative technical solution with anchors for dynamic loads and high corrosion resistance, the FHB Dyn 16x125/110 C. With the French certifying body CETU the needs in case of fire have been approved.

Your dealer:

www.fischer-international.com

fischer stands for

FIXING SYSTEMS
AUTOMOTIVE
FISCHERTECHNIK
CONSULTING
LNT AUTOMATION

fischer a/s
Sandvadsvej 17A · 4600 Køge
Denmark
T +45 4632 0220
www.fischerdanmark.dk · fidk@fischerdanmark.dk

535158 · 09/2022 · Printed in Denmark · We reserve the right to make technical modifications.

MIX
Paper from responsible sources
FSC® C012075
www.fsc.org

NORDIC SWAN ECO-LABEL
Printed matter
5041 0004

ClimateCalc