CABLE SOLUTION FOR THE RAILWAY

Telecommunication and signalling cables
Schwechater kabelwerke GmbH

Your expert partner located in Schwechat / Austria that offers a wide spectrum of cables.
First-class supplier. Expert partner.

PRAKAB PRAŽSKÁ KABELOVNA, s.r.o.

Leading producer of quality power and railway signalling cables in Prague / Czech Republic.
Experienced manufacturer. Extensive know-how.

TOV Interkabel Kiev

Producer of quality power and safety cables in Kiev / Ukraine.
European standard. FRNC specialist.

ACT Advanced Cable Technologies, s.r.o.

Top supplier of safety cables of the highest quality in St. Petersburg / Russia.
European quality. Exclusive PRAFiA dealer.

ICS Industrial Cables Slovakia, spol. s r.o.

Flexible specialists for the production of high quality industrial cables in Nitra / Slovakia.
Flexible solutions. Innovative partner.

SKG Netzwerktechnik GmbH
FCS Fiber-Components-Slovakia s.r.o.

Specialists for data network engineering and producer of fibre optic cables in Schwechat and Nitra.
Flexible solution. Top quality.
Since 1921, people have been using modern technology with our help, and thereby, we make it possible for the modern world to function. Thanks to us, electric energy can breathe life into the many things that surrounds us today, thanks to us, signals can control the world, our products are the arteries to the heart and the nervous system of every modern device.

Our products are often hidden from the view, and despite this, they are extremely important. 370 our colleagues, including the experts in development, are working to get energy or information safely to its destination. We are a traditional, innovative and reliable partner.

An important role in our company is also played by the fact, that we are part of the Austrian SKB Group, which puts emphasis on the support of development, introduction of innovations, team cooperation and exchange of experience between the individual members of the group from Schwechat across Prague, Nitra, St. Petersburg to Kiev.

We are PRAKAB PRAŽSKÁ KABEOVNA, expert in the field of LFHC (low fire hazard cables)/FRNC (flame retardant non-corrosive) cables.

Ing. Tomáš Zieschang, Ph.D.,
CEO
THE EUROPEAN RAILWAY NETWORK IS GETTING DENSER AND THE DEMANDS FOR SAFETY ARE INCREASING

The quality of our products for railway transportation is grounded in the long tradition in the production of communication, signalling and power cables.

We produce cables:
- for laying into the ground
- in an aerial design
- for installations in buildings
- with improved properties in the event of fire for installation in tunnels or in spaces with an increased concentration of people.

Communication and signalling cables from the PRAKAB workroom find their use in a wide range of applications, in various environments and conditions. They confirm its leading position especially by applications in railway and public transportation, further in telecommunication networks and last, but not least, in industrial electronics for controlling, signalling and telecommunication systems.

Communication and signalling cables are often placed within the proximity of sources of an electromagnetic field, which can cause interference of the signals that the cables transmit. This can lead, for example, to distortion of transmitted information or to the transmission of a wrong signal.

REDUCTION FACTOR

Therefore, an important parameter of cable screening used for transmission of information is its ability to decrease the intensity of an electromagnetic field that flows into the cables from external sources. The degree of such a decrease is called reduction factor and there is a testing method to establish its value under the designation DIN VDE 0472-507 - Testing of cables, wires and flexible cords – Reduction factor.

The reduction factor depends on interference frequency and on screening impedance. It can achieve values from 0 to 1, while 0 means absolute elimination of interference, the reduction factor with the value of 1 corresponds to a cable without screening.

COMMUNICATION CABLES

Communication cables serve for the transmission of signals between communication devices, for stable placement of indoor and outdoor wiring in communication technology or as a telecommunication backbone and access networks. We distinguish between outdoor and indoor communication cables.

CONSTRUCTION:

Indoor communication cables:
- Cu conductor
- Insulation (PE, PVC, FRNC, silicone rubber)
- Cores stranded into an element (pair, quad) and those into a bundle and cable core
- Inner covering (dielectric separation tape)
Outdoor communication cables:

- Cu conductor
- Insulation (FOAM SKIN PE, PE)
- Cores stranded into an element (pair, quad) and these into a bundle and cable core
- The cable core may be filled with water-blocking material
- Inner covering (dielectric separation tape)
- Layered sheath (double laminated Al. tape + PE sheath)
- Outer covering (Al wires, FeZn wires)
- External protection sheath (PE, PVC)

Overview of communication and signalling cables

- Industrial controlling cables
- Indoor communication cables – unscreened
- Indoor communication cables with Al screening
- Indoor communication cables with Al screening of the cable core and pairs
- Aerial cables with PE sheath and Al screening
- Underground cables - screened
- Underground cables, screened, armoured, with induction protection
- Underground cables, screened, longitudinally water-proof
- Underground cables, screened; longitudinally water-proof, armoured, with induction protection
- Indoor communication cables with an Al screening, lay-stranded
- Indoor communication cables with an Al screening, lay-stranded, for fire signalling

TRANSPORTATION

Transportation is practically as old as humanity itself. It has developed from primitive transportation of cargos up to the current, relatively comfortable and fast transportation of persons and cargos. The transportation itself does not produce anything, on the contrary, it consumes energy, but humanity has depended on its perfect functioning for a number of centuries already, it is a condition for the existence and development of society, height and quality of the standard of living. Efficacy and speed of transportation, its energy consumption and influence on the environment immediately affects the development of society and sustainable development of an area.

TRANSPORT INFRASTRUCTURE

Transport infrastructure mainly has to secure the safety of all the participants of transport, at the same time, it actively partakes in landscape formation and protection. Transportation is primarily a service for development of an area, however, in its expansion, it has to minimize the demands for area confiscation, it has to protect the environment and minimize negative impacts of construction. Despite these great demands, the transport infrastructure has to fulfill all the demands and it has to serve the area as well as possible.
- PE signalling cables – screened
- PE signalling cables – screened, armoured, with induction protection and PE sheath
- PE signalling cables – screened, armoured, with induction protection and a PVC sheath

**SIGNALLING CABLES**

- Serve for the transmission of signals between communication devices or for laying of wiring for telecommunication, controlling and signalling railway systems. They are used for the connection of safety devices in transportation:
- road transport – traffic lights, variable traffic signs, monitoring of road transport density;
- railway transport – safety devices such as traffic lights, traffic management, crossings, information systems
- subway – safety devices for traffic management or connection of information systems

**CONSTRUCTION:**

- Cu conductor
- Insulation (PE)
- Cores stranded into an element (pair, quad) and these into a bundle and cable core, an individual core is also an element
- Inner covering (dielectric separation tape)
- Sheath (PVC, PE, FRNC)
- Mechanical protection (Fe tape, Fe wires)
- Screening that determines the reduction factor (Cu wires, Cu tape)
- External protection sheath (PVC, PE, FRNC)

**RELATION TO SAFETY**

Traffic safety is an independent and very serious issue, since when neglected, human lives are lost, health shattered and there are considerable economic losses. The degree of safety is quite different in individual kinds of transport. The highest degree of safety is in air transportation, which is rooted in the character of this transportation, its narrow connection to international transport and thereby in necessary adoption and compliance with international standards. Safety in railway transportation is also positively affected by its international relations and obligations, whereas the international operation is frequently affected by grave errors due to insufficient (dated) operation security, especially in connection with ground communications by underestimation in equipment and security of complex intersections¹.

**STANDARD OF DEVELOPED EU COUNTRIES**

A narrow connection between railway transport and other system of transportation has already become a standard within town cores. The railway is becoming a part of the inner-city system of collective passenger transport and in close cooperation with subway, tram, bus and trolleybus infrastructures (according to town size and existence of such infrastructures) it directly serves the adjacent area by conveniently located stations. To the benefit of quality service, the difference between collective passenger transport and railway is disappearing. Adequately with respect to area configuration, existence and routing of transport systems and roads, similar principles apply to area services even for smaller towns and villages.

SIGNALLING AND COMMUNICATION CABLES FOR SPECIAL USE

Serve for the control of safety and controlling devices, measuring devices and devices for remote control. Exist even in a version for an environment with increased fire hazard (LFHC/FRNC cables) or for the specific conditions of subways. They are suitable even for outdoor placement and it is also possible to produce them to be UV-resistant.

CONSTRUCTION:

- according to requirements specification of the client
- special requirements for constructions to comply with the reduction factor

LFHC COMMUNICATION AND SIGNAL CABLES WITH REACTION-TO-FIRE PERFORMANCE CLASS

These cables are divided into two main groups: without and with functional integrity of 30–90 minutes in the event of fire.

CABLES WITHOUT FUNCTIONAL INTEGRITY IN THE EVENT OF FIRE

Used for the transmission of analogue and digital data, they are designated for stable placement of internal wiring in communication technology for the protection of people and valuable (expensive) devices (equipment, property) in the event of fire. They will find their place anywhere, where in the case of fire, a small amount of released heat and smoke is required along with no dropping burning particles.

EUROPEAN TRANSPORTATION POLICY

The aim of the European railway transportation policy is to create a unified railway space. The opening of this branch to competition, which has been started in 2001, was in the course of ten years regulated by three packages and one revision. The fourth package, focused on the completion of liberalisation of railway transport, has been adopted by the European Parliament in its full extent in first reading (February 2014), and when it comes to the technical pillar, also in the second reading (28th of April 2016)².

AIMS

The common transport policy, which is supposed to secure just the competition condition and which is supposed to secure free provision of services, requires execution of harmonisation of rules in the field of technology, management and safety. Gradual harmonisation of these requirements is necessary for the inner-operability of individual inner-state railway systems. Certain harmonisation may be necessary also in the field of measures for the protection of the environment or consumers, so that competition was not breached and that the access to new undertakings was simplified.

Plan of the Commission called “Transport 2050” sets the following aims:
1. from the long-term point of view, to complete this European high-speed railway network;
2. from the medium-term point of view (until 2030), to triple the length of the existing high-speed railway networks and to maintain dense railway network of all the member states.
3. It further requests, that transportation of majority of the volume of passengers travelling medium distance was until 2050 conducted on the railway².

CONSTRUCTION:

- Cu conductor
- Insulation (halogen-free polymer material (FRNC))
- Cores stranded into an element (pair or quad) and these are stranded into a cable core
- Inner covering (halogen-free dielectric separation tape)
- Screening (laminated Al foil with drain wire)
- Filling FRNC rubber
- Sheath (FRNC polymer)

CABLES WITH FUNCTIONAL INTEGRITY IN THE EVENT OF FIRE

Used for the transmission of analogue and digital data, they are designated for stable placement of internal wiring in communication technology and for various transmission systems including ADSL2+ and VDSL2, but also for the protection of people and valuable (expensive) devices (equipment and property) in the event of fire. Mainly anywhere, where in the case of fire, a small amount of released heat and smoke is required along with no dropping burning particles. Based on their properties, they are suitable for installation in hotels, hospitals, subways, airports etc. They find their application anywhere, where functional integrity of the whole cable system is required in the case of fire.

CONSTRUCTION:

- Cu conductor
- Insulation (silicone rubber, foam-skin silicone rubber)
- Cores stranded into an element (pair or quad) and these are stranded into a cable core
- Inner covering (halogen-free dielectric separation tape)
- Screening (laminated Al foil with a drain wire)
- Filling FRNC rubber
- Sheath (FRNC polymer)
PASSION FOR QUALITY

A quality product with flawless properties has become a common expectation of our customers already a long time ago. We believe, that we are capable of offering even more and we are shifting the term QUALITY further and projecting it into all of our activities. We believe, that the basis of a quality product are quality people and their qualifications, which we continuously increase. We believe that an inseparable part of the product is its packaging and we take care of its quality. We believe, that a great share in quality is in logistics and logistic solutions that we are not afraid to adapt according to your requirements. We believe in additional services and perfect customer service.

WE BELIEVE THAT IT’S THE DETAIL THAT MAKES THE WHOLE!
## INDOOR TELECOMMUNICATION CABLES

<table>
<thead>
<tr>
<th>Screened</th>
<th>Czech standard ČSN / TP PRAKAB</th>
<th>International standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecommunication cables with aluminium screen</td>
<td>SYKFY, BYFY-M</td>
<td>J-Y(St)Y...Lg, Bd (VDE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F-YAY (ÖVE)</td>
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<tr>
<td></td>
<td></td>
<td>JB-Y(St)Y (VDE)</td>
</tr>
<tr>
<td>Control cables for industrial electronics</td>
<td>CMSM, CMFM, JQTQ, JYTY</td>
<td>YSLY (VDE)</td>
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<tr>
<td></td>
<td></td>
<td>YSLCY (VDE)</td>
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<tr>
<td></td>
<td></td>
<td>JE-Y(St)Y...Bd (VDE)</td>
</tr>
</tbody>
</table>

## OUTDOOR TELECOMMUNICATION CABLES

<table>
<thead>
<tr>
<th>Overhead</th>
<th>Czech standard ČSN / TP PRAKAB</th>
<th>International standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cables with PE sheath and aluminium screen</td>
<td>TCEKES</td>
<td>F-2YAT2Y (ÖVE)</td>
</tr>
<tr>
<td>Undergraduate cables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screened cables</td>
<td>TCEKFLE</td>
<td>A-2Y(L)2Y...Bd (VDE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F-2YA2Y (ÖVE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F-2YC2Y (ÖVE)</td>
</tr>
<tr>
<td>Waterproof screened cables</td>
<td>TCEKPFLEY, TCEPKPFLE</td>
<td>A-2YF(L)2Y (VDE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F-02YHJA2Y (ÖVE)</td>
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<tr>
<td></td>
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<td>HvrQ (MÁV)</td>
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<tr>
<td></td>
<td></td>
<td>TK 59 GM (JUS)</td>
</tr>
<tr>
<td>Armouring waterproof screened cables</td>
<td>TCEKPFLEZE, TCEPKPFLEZE</td>
<td>F-02YHJA2YR (ÖVE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F-02HJA2Y8Y (ÖVE)</td>
</tr>
<tr>
<td>Telecommunication cables screened, armoured</td>
<td>TCEKFLEZE</td>
<td>AJ-02Y2YD2YB2Y (TCDD)</td>
</tr>
</tbody>
</table>
# RAILWAY SIGNALLING CABLES

<table>
<thead>
<tr>
<th>Unscreened</th>
<th>Czech standard ČSN / TP PRAKAB</th>
<th>International standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signalling cables unscreened, armoured</td>
<td>–</td>
<td>A-2Y2YB2Y (DB) S-2Y2YBY (ÖVE) SW-CLT (SBB)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screened, reduction factor</th>
<th>Czech standard ČSN / TP PRAKAB</th>
<th>International standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signalling cables screened, armoured</td>
<td>TCEKPFLEZE</td>
<td>AJ-2Y2YDB2Y (DB) BRQKAIQAhvQ (MÁV) S-2Y2YCB2Y (ÖVE) S-2YYC2YB2Y (TCDD)</td>
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</tbody>
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# HALOGEN-FREE TELECOMMUNICATION AND SIGNALLING CABLES without reaction-to-fire performance class

<table>
<thead>
<tr>
<th></th>
<th>Czech standard ČSN / TP PRAKAB</th>
<th>International standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible cable unscreened, oil-resistant</td>
<td>–</td>
<td>HSLH (STN)</td>
</tr>
<tr>
<td>Flexible cable screened, oil-resistant</td>
<td>–</td>
<td>HSLCH (STN)</td>
</tr>
<tr>
<td>Cable without functional integrity, screened</td>
<td>SHKFH-R</td>
<td>J-(H)(St)H...Bd (VDE)</td>
</tr>
<tr>
<td>Cable with insulation integrity 180 min, screened</td>
<td>SSKFH-V180</td>
<td>J-(H)(St)H...Bd FE180 (VDE)</td>
</tr>
<tr>
<td>Cable with functional integrity of cable system 30–90 min, screened</td>
<td>–</td>
<td>JE-(H)(St)H...Bd FE180/ E30-E90 (VDE)</td>
</tr>
</tbody>
</table>
# HALOGEN-FREE TELECOMMUNICATION AND SIGNALLING CABLES

with reaction-to-fire performance class \(\text{B}_{ca}^{s1d0}\) according to EN 50399 and 2006/751/EC

<table>
<thead>
<tr>
<th>Czech standard</th>
<th>International standards</th>
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<tr>
<td>ČSN / TP PRAKAB</td>
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<table>
<thead>
<tr>
<th>Cable without functional integrity, screened</th>
<th>PRAFlaCom(^\text{®}) F</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable with functional integrity of cable system 30–90 min, screened</td>
<td>PRAFlaGuard(^\text{®}) F</td>
<td>-</td>
</tr>
</tbody>
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# HALOGEN-FREE DATA CABLE

with reaction-to-fire performance class \(\text{B}_{ca}^{s1d0}\) according to EN 50399 and 2006/751/EC

<table>
<thead>
<tr>
<th>Czech standard</th>
<th>International standards</th>
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</thead>
<tbody>
<tr>
<td>ČSN / TP PRAKAB</td>
<td></td>
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</tbody>
</table>

| Cable with functional integrity of cable system 30–90 min, screened | PRAFlaGuard\(^\text{®}\) FTP | - |

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**NEW**

VDE – German Association for Electrical, Electronic and Information Technologies

ÖVE – Austrian Electrotechnical Association

STN – Slovakian National Standards

JUS – Yugoslavia Standards

SBB – Swiss Federal Railways

TCDD – Turkish State Railways

DB – German Railway

MÁV – Hungarian railways
Almost all European states invest considerable financial amounts into modernisation. Here, the clients can rely on the long tradition of development in this field that PRAKAB disposes of. For cable producers such as PRAKAB, the main and most interesting challenge in this customer segment is to fulfil the requirements of all the various current regional standards.

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